IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): **KIRBAS, et al.**	Group Art Unit: **2617**
App. No.: **09/849,715**	Examiner: **DANIEL, Jr., Willie J.**
Filed: **May 4, 2001**	Conf.: **9648**
Title: **SYSTEM AND METHOD FOR RESTRICTING WIRELESS COMMUNICATION**	

Mail Stop Appeal Briefs – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

APPELLANTS' APPEAL BRIEF UNDER 37 CFR §41.37

In accordance with the Notice of Appeal to the Board of Patent Appeals and Interferences dated January 20, 2010, in the above-identified U.S. Patent Application, Appellants hereby present the Appellants' Appeal Brief under 37 CFR §41.37. The APPELLANTS' APPEAL BRIEF is submitted with copies of each reference discussed and a copy of the Final Office Action as well as the appropriate fees required under 37 CFR §41.20(b)(2).

TABLE OF CONTENTS

REAL PARTY IN INTEREST

Kyocera Corporation in Japan, is the real party in interest as the assignee and 100 percent owner of the above-identified application.

RELATED APPEALS AND INTERFERENCES

Appellants are not aware of any prior or pending appeals, judicial proceedings, or interferences that may be related to, directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

STATUS OF CLAIMS

Claims 46, 48, and 63-67 stand rejected. Claims 1-45, 47, and 49-58 have been canceled. Claims 59-62 have been withdrawn. The claims on appeal include claims 46, 48, and 63-67.

STATUS OF AMENDMENTS

At the time of filing of the Appeal Brief, Appellant is not aware of the status of the amendment filed on July 09, 2010 to correct a typographical error in claim 63.

SUMMARY OF CLAIMED SUBJECT MATTER

In accordance with 37 CFR § 41.37(v), Appellants provide a brief summary of each independent claim involved in the appeal, where each summary refers to the specification by page and line number and to the drawings by reference number. Appellants note that this "Summary of claimed subject matter" is provided only to assist the Board in identifying some portions of the specification related to the particular claims. In the interest of brevity, each claim summary does not necessarily include all references to all relevant portions of the specification and drawings. Accordingly, omission of any reference to the specification or to the drawings should not be construed in any way as an intent to relinquish claim scope, or as an implication or statement regarding the conformance with 35 U.S.C. §112. Appellants respectfully submit that the claims should not be construed as being limited to the embodiments described or referenced in any claim summary, and further submit that other embodiments, as well as the Doctrine of Equivalents, may apply in determining claim scope.

Claim 46

The subject matter of independent claim 46 is directed to a wireless communication device (Specification, page 5, lines 6-7; Figure 1, reference character 100). The wireless communication device comprises a read only memory (Specification, page 4, lines 1-3; page 9, lines 8-9; Figure 1, reference character 130) for storing a list comprising area codes, at least a portion of which are authorized area codes (Specification, page 6, line 20-page 7, line 1). The read only memory is also for storing one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information (Specification, page 10, lines 7-14). The wireless communication device further comprises a user interface for accepting an inputted phone number having an area code (Specification, page 5, lines 19-20; Figure 1, reference character 170); a global positioning system (GPS) device for determining a current location of the wireless communication device (Specification, page 10, lines 2-3; Figure 1, reference character 185); and a controller (Specification, page 5, lines 7-8; Figure 1, reference character 120). The controller is connected to the read only memory, the user interface, and the GPS device (Specification, page 5, lines 6-10; page 5, line 23-page 6, line 1; page 10, lines 1-3; Figure 1, reference characters 120, 130, 170, 185, and 110), and is configured to determine

whether the inputted phone number will incur a charge based on an evaluation of at least the area code, the current location, and the list comprising area codes and the one or more authorized geographic areas stored in the read only memory (Specification, page 6, line 13-page 7, line 3; page 10, lines 7-10). The controller is further configured to permit placement of a phone call to the inputted phone number only if the area code is an authorized area code (Specification, page 7, lines 8-13 and 18-19; Figure 2, reference character 250) and the current location of the wireless communication device is within an authorized geographic area (Specification, page 10, lines 8-10).

Claim 63

The subject matter of independent claim 63 is directed to a method for restricting a requested communication on a wireless communication device (Specification, page 6, lines 13-14; Figure 2, reference characters 215-290). The method comprising storing in a read only memory of the wireless communication device one or more authorized geographic areas (Specification, page 10, lines 8-10; Figure 2, reference character 215), wherein each authorized geographic area comprises absolute or relative position information (Specification, page 10, lines 7-14) and storing in the read only memory of the wireless communication device one or more authorized telephone number area codes (Specification, page 6, line 20-page 7, line 1; Figure 2, reference character 215). The method further comprises receiving the requested communication, wherein the requested communication comprises a telephone number having an area code (Specification, page 7, lines 5-6; Figure 2, reference character 230) and determining whether the area code of the requested communication telephone number is an authorized telephone number area code stored in the read only memory of the wireless communication device (Specification, page 7, lines 6-13; Figure 2, reference characters 240 and 250). Additionally, the method includes identifying a current location of the wireless communication device (Specification, page 10, lines 2-3), determining whether the current location of the wireless communication device is within an authorized geographic area stored in the read only memory of the wireless communication device (Specification, page 10, lines 8-10), and initiating a call to the telephone number in the requested communication (Specification, page 7, lines 5-6; Figure 2, reference character 270) only if the area code of the requested communication telephone number is an authorized telephone number area code and the current location of the wireless communication

device is within an authorized geographic area (Specification, page 10, lines 8-10).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Appellants wish the Board of Patent Appeals and Interferences to review the following grounds of rejection on appeal:

1) Whether claims 46, 48, and 63-67 are unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,208,872 to Schmidt ("Schmidt") in view of U.S. Patent No. 7,212,802 to Rodriguez ("Rodriguez") and further in view of U.S. Patent No. 6,556,819 to Irvin ("Irvin").

2) Whether claims 46 and 63 are unpatentable under 35 U.S.C. §103(a) over Schmidt in view of Rodriguez and further in view of U.S. Patent No. 6,799,052 to Agness, et al. ("Agness").

ARGUMENT

Appellants respectfully submit that claims 46, 48, and 63-67 are allowable over the cited portions of the cited references. The issues presented for review are addressed below.

I. REJECTION OF CLAIMS 46, 48, AND 63-67 UNDER 35 U.S.C. §103(A) OVER SCHMIDT IN VIEW OF RODRIGUEZ AND FURTHER IN VIEW OF IRVIN IS IMPROPER

The Examiner rejected claims 46, 48, and 63-67 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,208,872 to Schmidt ("Schmidt") in view of U.S. Patent No. 7,212,802 to Rodriguez ("Rodriguez") and further in view of U.S. Patent No. 6,556,819 to Irvin ("Irvin"). Appellants respectfully submit that this rejection is improper for at least the following reasons.

The failure of the cited art to teach or suggest each and every feature of a claim is fatal to an obviousness rejection under 35 U.S.C. § 103. For example, section 2143.03 of the MPEP requires the "consideration" of every claim feature in an obviousness determination. For a proper rejection, this "consideration" requires that the Examiner find that Fishman teaches or suggests each and every claim feature. *See In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974) (emphasis added) (to establish *prima facie* obviousness of a claimed invention, all the claim features must be taught or suggested by the prior art). As the Board of Patent Appeals and Interferences has recently confirmed, a proper obviousness determination requires that an Examiner make "a searching comparison of the claimed invention—*including all its limitations*—with the teaching of the prior art." See *In re Wada and Murphy*, Appeal 2007-3733, *citing In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995) (emphasis in original). Further, the necessary presence of all claim features is axiomatic, since the Supreme Court has long held that obviousness is a question of law based on underlying factual inquiries, including . . . ascertaining the differences between the claimed invention and the prior art. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966) (emphasis added).

Appellants submit that this is why Section 904 of the MPEP instructs Examiners to conduct an art search that covers "the invention as described and claimed." (emphasis added). Further, Appellants respectfully direct attention to MPEP § 2143, the instructions of which buttress the conclusion that obviousness requires at least a suggestion of all of the features of a claim, since the Supreme Court in *KSR Int'l v. Teleflex Inc.* stated that "there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR Int'l v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007) (*quoting In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Accordingly, it remains well-settled law that an obviousness rejection requires at least a suggestion of all of the features in a claim. *See In re Wada and Murphy, citing CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) and *In re Royka*, 490 F.2d 981, 985 (CCPA 1974).

For the reasons discussed below, Appellants respectfully submit that the cited portions of the cited references, taken alone or in combination, fail to teach or suggest all the limitations of any of the rejected claims.

Claim 46

For example, independent claim 46 recites, among other limitations, "a read only memory for storing a list comprising area codes, at least a portion of which are authorized area codes, the read only memory also for storing one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information" and "determine whether the inputted phone number will incur a charge based on an evaluation of at least the area code, the current location, and the list comprising area codes and the one or more authorized geographic areas stored in the read only memory." Appellants submit that not all of these limitations are taught or suggested by the cited portions of the cited references.

In maintaining the rejection, the Examiner relies on Schmidt, Rodriguez, and Irvin in an attempt to show these limitations. Specifically, the Examiner characterizes memory 58 of Schmidt as the "read only memory" recited in Appellants' claims. The Examiner also indicates that the home system 74 of mobile station 28 of Schmidt is equivalent to both the "authorized area codes" and the "authorized geographic areas" recited in Appellants' claims. The Examiner references Rodriguez to show authorized pairs of area codes. The Examiner relies on Irvin to show a GPS device. The Examiner also characterizes position memory 170 of Irvin as the "read

only memory" recited in Appellants' claim 46 and characterizes the "safe zones" of Irvin as the "authorized geographic areas" recited in Appellants' claim 46. (See Final Office Action dated October 20, 2009, pages 3-8).

Appellants respectfully submit that the cited portions of Schmidt, Rodriguez, and Irvin, taken alone or in combination, fail to teach or suggest every limitation of Appellants' claim 46, as suggested by the Examiner. For example, Schmidt (col. 6, lines 29-32) states that "memory 58 is a storage area utilized as a phone book where users may program both phone numbers and alphanumeric tags (alpha tags) (e.g., names) associated with these numbers." (Emphasis added). Given the fact that memory 58 of Schmidt is user-programmable, Appellants submit that memory 58 of Schmidt cannot reasonably be interpreted as a read only memory. The plain language of Appellants' claim 46 clearly recites a "read only memory," which is neither taught nor suggested by the programmable memory 58 of Schmidt.

Moreover, Appellants submit that the cited portions of Rodriguez and Irvin, taken alone or in combination with the cited portions of Schmidt, fail to teach or suggest "a read only memory for storing a list comprising area codes, at least a portion of which are authorized area codes, the read only memory also for storing one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information." For example, the cited portions of Rodriguez do not teach or suggest any specific type of memory, much less a read only memory. In regards to Irvin, Appellants submit that position memory 170 of Irvin is also programmable in that a user may input safe zone locations, shapes, and sizes into position memory 170. (See Irvin, col. 6, lines 1-18). Further evidence that position memory 170 is programmable can be seen from the fact that col. 4, lines 37-39 of Irvin describes how position memory 170 could be a separate RAM memory, which is not equivalent to a read only memory.

Further, the cited portions of Irvin are silent regarding the type of memory that comprises the other memory of Irvin (e.g., memory 150). From the fact that position memory 170, which is necessarily programmable, can be embodied as an address space in memory 150, Appellants submit that memory 150 is also programmable and not equivalent to a read only memory. (See Irvin, col. 4, lines 35-37).

Thus, Appellants submit that both the cited portions of Schmidt and Irvin teach programmable memories, which do not read upon Appellants' claimed "read only memory." Moreover, the cited portions of Rodriguez do not teach or suggest any type of memory.

Therefore, in combination, the cited references teach either a programmable memory or are silent regarding memory type. However, assuming arguendo that the cited portions of either Rodriguez or Irvin did contain a teaching or suggestion of a "read only memory," which Appellants do not concede, it would be improper to combine such a teaching with the teachings of the primary reference, Schmidt.

For example, according to MPEP 2143.01, Section V., any attempt to substitute a read only memory (e.g., from any reference) for the memory of the primary reference (e.g., memory 58 of Schmidt) is not proper because a read only memory would render Schmidt unsatisfactory for its intended purpose of allowing users to program and dial phone numbers of their choosing so long as the mobile station is not roaming. For example, the "Background of the Invention" of Schmidt (col. 1, lines 48-54) specifically indicates that a potentially undesirable situation would be created if a user was restricted to only dialing out to phone numbers stored in the memory, which would be the case if a read only memory were utilized in conjunction with the teachings of Schmidt. Thus, utilizing a read only memory in combination with Schmidt would render Schmidt unsatisfactory for its intended purpose. Therefore, Appellants submit that a "read only memory" from any reference may not be properly combined with the cited portions of Schmidt in an attempt to render Appellants' claim 46 obvious.

Furthermore, Appellants respectfully submit that the cited portions of Schmidt do not teach or suggest a read only memory that stores one or more authorized geographic areas, where each authorized geographic area comprises absolute or relative position information, as recited in claim 46. Rather, Schmidt, col. 7, lines 51-54, describes storing a home system ID number that does not comprise any absolute or relative position information. In contrast to claim 46, the cited portions of Schmidt describe calculating, in real time, whether the current wireless communication system ID number matches the stored home wireless communication system ID number. The cited portions of Schmidt require that the current system ID number is received by the mobile station over the air via the control channel of the wireless communication system. (See Schmidt, col. 7, lines 47-58). Thus, the cited portions of Schmidt describe a numerical matching calculation and do not teach or suggest any notion of storing one or more authorized geographic areas in read only memory where each authorized geographic area comprises absolute or relative position information.

The Examiner also indicates that the "safe zones" of Irvin are equivalent to the "authorized geographic areas" recited in Appellants' claim 46 since the safe zones may be defined by geocoordinates from a GPS receiver. Careful examination of the reference, however, reveals that the cited portions of Irvin do not teach or suggest storing the safe zones in a read only memory. Rather, the user-programmable safe zones of Irvin are stored in position memory 170, which, as described above, is a programmable memory that is not equivalent to a read only memory. Thus, the cited portions of Irvin do not teach or suggest storing authorized geographic areas in read only memory.

As described above, the cited portions of Schmidt do not store any authorized geographic areas that each comprise absolute or relative position information. The Examiner does not cite to Rodriguez to show this limitation, and the cited portions of Irvin clearly do not show storing safe zones in a read only memory. Therefore, taken alone, none of the cited references teach or suggest storing authorized geographic areas in a read only memory, each of the authorized geographic areas comprising absolute or relative position information. In combination, the cited portions of the cited references would result in storing the home system ID number of Schmidt in the programmable position memory 170 of Irvin. Clearly, this combination does not teach or suggest a "read only memory also for storing one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information," as recited in Appellants' claim 46.

In light of the absence of a teaching or suggestion of a "read only memory for storing one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information" by the cited references, Appellants submit that, necessarily, the cited portions of the cited references also fail to teach or suggest determining "whether an inputted phone number will incur a charge based on an evaluation of the one or more authorized geographic areas stored in the read only memory," as recited in Appellants' claim 46. Appellants submit that the recited determination (e.g., whether a charge will be incurred) cannot be taught or suggested by the cited portions of the cited references since the determination is based on something that is wholly absent from the cited portions of the cited references (e.g., authorized geographic areas stored in the read only memory).

In light of the foregoing, Appellants submit that the cited portions of Schmidt, Rodriguez, and Irvin fail to teach or suggest every limitation of claim 46. Accordingly, Appellants respectfully request reversal of this rejection.

Claim 63

Independent claim 63 recites, among other limitations, "storing in a read only memory of the wireless communication device one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information; storing a the read only memory of the wireless communication device one or more authorized telephone number area codes" and "determining whether the current location of the wireless communication device is within an authorized geographic area stored in the read only memory of the wireless communication device." (Emphasis added). Appellants submit that not all of these limitations are taught or suggested by the cited portions of the cited references.

In maintaining the rejection, the Examiner relies on Schmidt, Rodriguez, and Irvin in an attempt to show these limitations. Specifically, the Examiner characterizes memory 58 of Schmidt as the "read only memory" recited in Appellants' claims. The Examiner also indicates that the home system 74 of mobile station 28 of Schmidt is equivalent to both the "authorized area codes" and the "authorized geographic areas" recited in Appellants' claims. The Examiner references Rodriguez to show authorized pairs of area codes. The Examiner relies on Irvin to show a GPS device. The Examiner also characterizes position memory 170 of Irvin as the "read only memory" recited in Appellants' claim 63 and characterizes the "safe zones" of Irvin as the "authorized geographic areas" recited in Appellants' claim 63. (See Final Office Action dated October 20, 2009, pages 9-13).

Appellants respectfully submit that the cited portions of Schmidt, Rodriguez, and Irvin, taken alone or in combination, fail to teach or suggest every limitation of Appellants' claim 63, as suggested by the Examiner. For example, Schmidt (col. 6, lines 29-32) states that "memory 58 is a storage area utilized as a phone book where users may program both phone numbers and alphanumeric tags (alpha tags) (e.g., names) associated with these numbers." (Emphasis added). Given the fact that memory 58 of Schmidt is user-programmable, Appellants submit that memory 58 of Schmidt cannot reasonably be interpreted as a read only memory. The plain

language of Appellants' claim 63 clearly recites a "read only memory," which is neither taught nor suggested by the programmable memory 58 of Schmidt.

Moreover, Appellants submit that the cited portions of Rodriguez and Irvin, taken alone or in combination with the cited portions of Schmidt, fail to teach or suggest "storing in a read only memory of the wireless communication device one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information; storing a the read only memory of the wireless communication device one or more authorized telephone number area codes." For example, the cited portions of Rodriguez do not teach or suggest any specific type of memory, much less a read only memory. In regards to Irvin, Appellants submit that position memory 170 of Irvin is also programmable in that a user may input safe zone locations, shapes, and sizes into position memory 170. (See Irvin, col. 6, lines 1-18). Further evidence that position memory 170 is programmable can be seen from the fact that col. 4, lines 37-39 of Irvin describes how position memory 170 could be a separate RAM memory, which is not equivalent to a read only memory.

Moreover, the cited portions of Irvin are silent regarding the type of memory that comprises the other memory of Irvin (e.g., memory 150). From the fact that position memory 170, which is necessarily programmable, can be embodied as an address space in memory 150, Appellants submit that memory 150 is also programmable and not equivalent to a read only memory. (See Irvin, col. 4, lines 35-37).

Thus, Appellants submit that both the cited portions of Schmidt and Irvin teach programmable memories, which do not read upon Appellants' claimed "read only memory." Moreover, the cited portions of Rodriguez do not teach or suggest any type of memory. Thus, in combination, the cited references teach either a programmable memory or are silent regarding memory type. However, assuming arguendo that the cited portions of either Rodriguez or Irvin did contain a teaching or suggestion of a "read only memory," which Appellants do not concede, it would be improper to combine such a teaching with the teachings of the primary reference, Schmidt.

For example, according to MPEP 2143.01, Section V., any attempt to substitute a read only memory (e.g., from any reference) for the memory of the primary reference (e.g., memory 58 of Schmidt) is not proper because a read only memory would render Schmidt unsatisfactory for its intended purpose of allowing users to program and dial phone numbers of their choosing

so long as the mobile station is not roaming. For example, the "Background of the Invention" of Schmidt (col. 1, lines 48-54) specifically indicates that a potentially undesirable situation would be created if a user was restricted to only dialing out to phone numbers stored in the memory, which would be the case if a read only memory were utilized in conjunction with the teachings of Schmidt. Thus, utilizing a read only memory in combination with Schmidt would render Schmidt unsatisfactory for its intended purpose. Therefore, Appellants submit that a "read only memory" from any reference may not be properly combined with the cited portions of Schmidt in an attempt to render Appellants' claim 63 obvious.

Furthermore, Appellants respectfully submit that the cited portions of Schmidt do not teach or suggest "storing in a read only memory of the wireless communication device one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information," as recited in claim 63. Rather, Schmidt, col. 7, lines 51-54, describes storing a home system ID number that does not comprise any absolute or relative position information. In contrast to claim 63, the cited portions of Schmidt describe calculating, in real time, whether the current wireless communication system ID number matches the stored home wireless communication system ID number. The cited portions of Schmidt require that the current system ID number is received by the mobile station over the air via the control channel of the wireless communication system. (See Schmidt, col. 7, lines 47-58). Thus, the cited portions of Schmidt describe a numerical matching calculation and do not teach or suggest any notion of storing one or more authorized geographic areas in read only memory where each authorized geographic area comprises absolute or relative position information.

The Examiner also indicates that the "safe zones" of Irvin are equivalent to the "authorized geographic areas" recited in Appellants' claim 63 since the safe zones may be defined by geocoordinates from a GPS receiver. However, a closer look reveals that the cited portions of Irvin do not teach or suggest storing the safe zones in a read only memory. Rather, the user-programmable safe zones of Irvin are stored in position memory 170, which, as described above, is a programmable memory that is not equivalent to a read only memory. Thus, the cited portions of Irvin do not teach or suggest storing authorized geographic areas in read only memory.

As described above, the cited portions of Schmidt do not store any authorized geographic areas that each comprise absolute or relative position information. The Examiner does not cite to

Rodriguez to show this limitation, and the cited portions of Irvin clearly do not show storing safe zones in a read only memory. Therefore, taken alone, none of the cited references teach or suggest storing authorized geographic areas in a read only memory, each of the authorized geographic areas comprising absolute or relative position information. In combination, the cited portions of the cited references would result in storing the home system ID number of Schmidt in the programmable position memory 170 of Irvin. Clearly, this combination does not teach or suggest a "read only memory also for storing one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information," as recited in Appellants' claim 63.

In light of the foregoing, Appellants submit that the cited portions of Schmidt, Rodriguez, and Irvin fail to teach or suggest every limitation of claim 63. Accordingly, Appellants respectfully request reversal of this rejection.

Dependent Claims

Claims 48 and 64-67 depend from independent claims 46 and 63, respectively. Accordingly, Appellants submit that claims 48 and 64-67 are allowable at least for the reason that they depend from an allowable base claim.

II. REJECTION OF CLAIMS 46 AND 63 UNDER 35 U.S.C. §103(A) OVER SCHMIDT IN VIEW RODRIGUEZ AND FURTHER IN VIEW OF AGNESS IS IMPROPER

The Examiner rejected claims 46 and 63 under 35 U.S.C. 103(a) as being unpatentable over Schmidt in view of Rodriguez and further in view of U.S. Patent No. 6,799,052 to Agness, et al. ("Agness"). Appellants respectfully submit that this rejection is improper for at least the reason that all of the limitations of any one of claims are not taught or suggested by the references.

Claim 46

For example, independent claim 46 recites, among other limitations, "a read only memory for storing a list comprising area codes, at least a portion of which are authorized area codes, the read only memory also for storing one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information" and "determine whether the inputted phone number will incur a charge based on an evaluation of at least the area code, the current location, and the list comprising area codes and the one or more authorized geographic areas stored in the read only memory." Appellants submit that not all of these limitations are taught or suggested by the cited portions of the cited references.

In maintaining the rejection, the Examiner relies on Schmidt, Rodriguez, and Agness in an attempt to show these limitations. Specifically, the Examiner characterizes memory 58 of Schmidt as the "read only memory" recited in Appellants' claims. The Examiner also indicates that the home system 74 of mobile station 28 of Schmidt is equivalent to both the "authorized area codes" and the "authorized geographic areas" recited in Appellants' claims. The Examiner references Rodriguez to show authorized pairs of area codes. The Examiner relies on Agness to show a GPS device and a controller to provide a transmission inhibit for digital hand-held cell phones when at a specified highway location and specified other restricted locations or during specific restricted times. (See Final Office Action dated October 20, 2009, pages 16-21).

In response, Appellants submit that the cited portions of Schmidt, Rodriguez, and Agness, taken alone or in combination, fail to teach or suggest every limitation of Appellants' claim 46, as suggested by the Examiner. For example, Schmidt (col. 6, lines 29-32) states that

"memory 58 is a storage area utilized as a phone book where users may program both phone numbers and alphanumeric tags (alpha tags) (e.g., names) associated with these numbers." (Emphasis added). Given the fact that memory 58 of Schmidt is user-programmable, Appellants submit that memory 58 of Schmidt cannot reasonably be interpreted as a read only memory. The plain language of Appellants' claim 46 clearly recites a "read only memory," which is neither taught nor suggested by the programmable memory 58 of Schmidt.

Moreover, Appellants submit that the cited portions of Rodriguez and Agness, taken alone or in combination with the cited portions of Schmidt, fail to teach or suggest "a read only memory for storing a list comprising area codes, at least a portion of which are authorized area codes, the read only memory also for storing one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information." For example, the cited portions of Rodriguez and Agness do not teach or suggest any specific type of memory, much less a read only memory.

Thus, Appellants submit that the cited portions of Schmidt teach programmable memories, which do not read upon Appellants' claimed "read only memory." Moreover, the cited portions of Rodriguez and Agness do not teach or suggest any type of memory. Thus, in combination, the cited portions of the cited references teach either a programmable memory or are silent regarding memory type, neither of which teaches or suggests a read only memory. However, assuming arguendo that the cited portions of either Rodriguez or Agness did contain a teaching or suggestion of a "read only memory," which Appellants do not concede, it would be improper to combine such a teaching with the teachings of the primary reference, Schmidt.

For example, according to MPEP 2143.01, Section V., any attempt to substitute a read only memory (e.g., from any reference) for the memory of the primary reference (e.g., memory 58 of Schmidt) is not proper because a read only memory would render Schmidt unsatisfactory for its intended purpose of allowing users to program and dial phone numbers of their choosing so long as the mobile station is not roaming. For example, the "Background of the Invention" of Schmidt (col. 1, lines 48-54) specifically indicates that a potentially undesirable situation would be created if a user was restricted to only dialing out to phone numbers stored in the memory, which would be the case if a read only memory were utilized in conjunction with the teachings of Schmidt. Thus, utilizing a read only memory in combination with Schmidt would render Schmidt unsatisfactory for its intended purpose. Therefore, Appellants submit that a "read only

memory" from any reference may not be properly combined with the cited portions of Schmidt in an attempt to render Appellants' claim 46 obvious.

Furthermore, Appellants respectfully submit that the cited portions of Schmidt do not teach or suggest a read only memory that stores one or more authorized geographic areas, where each authorized geographic area comprises absolute or relative position information, as recited in claim 46. Rather, Schmidt, col. 7, lines 51-54, describes storing a home system ID number that does not comprise any absolute or relative position information. In contrast to claim 46, the cited portions of Schmidt describe calculating, in real time, whether the current wireless communication system ID number matches the stored home wireless communication system ID number. The cited portions of Schmidt require that the current system ID number is received by the mobile station over the air via the control channel of the wireless communication system. (See Schmidt, col. 7, lines 47-58). Thus, the cited portions of Schmidt describe a numerical matching calculation and do not teach or suggest any notion of storing one or more authorized geographic areas in read only memory where each authorized geographic area comprises absolute or relative position information.

Thus, the cited portions of Schmidt do not store any authorized geographic areas that each comprise absolute or relative position information. Rather, the cited portions of Schmidt describe storing the home system ID number, which does not contain absolute or relative position information. The Examiner does not cite to Rodriguez or Agness to show this limitation. Therefore, none of the cited portions of the cited references teach or suggest storing authorized geographic areas in a read only memory, each of the authorized geographic areas comprising absolute or relative position information.

In light of the foregoing, Appellants submit that the cited portions of Schmidt, Rodriguez, and Agness fail to teach or suggest every limitation of claim 46. Accordingly, Appellants respectfully request reversal of this rejection.

Claim 63

Independent claim 63 recites, among other limitations, "storing in a read only memory of the wireless communication device one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information; storing a the read only memory of the wireless communication device one or more authorized telephone number

area codes" and "determining whether the current location of the wireless communication device is within an authorized geographic area stored in the read only memory of the wireless communication device." (Emphasis added). Appellants submit that not all of these limitations are taught or suggested by the cited portions of the cited references.

In maintaining the rejection, the Examiner relies on Schmidt, Rodriguez, and Agness in an attempt to show these limitations. Specifically, the Examiner characterizes memory 58 of Schmidt as the "read only memory" recited in Appellants' claims. The Examiner also indicates that the home system 74 of mobile station 28 of Schmidt is equivalent to both the "authorized area codes" and the "authorized geographic areas" recited in Appellants' claims. The Examiner references Rodriguez to show authorized pairs of area codes. The Examiner relies on Agness to show a GPS device and a controller to provide a transmission inhibit for digital hand-held cell phones when at a specified highway location and specified other restricted locations or during specific restricted times. (See Final Office Action dated October 20, 2009, pages 21-24).

In response, Appellants submit that the cited portions of Schmidt, Rodriguez, and Agness, taken alone or in combination, fail to teach or suggest every limitation of Appellants' claim 63, as suggested by the Examiner. For example, Schmidt (col. 6, lines 29-32) states that "memory 58 is a storage area utilized as a phone book where users may program both phone numbers and alphanumeric tags (alpha tags) (e.g., names) associated with these numbers." (Emphasis added). Given the fact that memory 58 of Schmidt is user-programmable, Appellants submit that memory 58 of Schmidt cannot reasonably be interpreted as a read only memory. The plain language of Appellants' claim 63 clearly recites a "read only memory," which is neither taught nor suggested by the programmable memory 58 of Schmidt.

Moreover, Appellants submit that the cited portions of Rodriguez and Agness, taken alone or in combination with the cited portions of Schmidt, fail to teach or suggest "storing in a read only memory of the wireless communication device one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information; storing a the read only memory of the wireless communication device one or more authorized telephone number area codes." For example, the cited portions of Rodriguez and Agness do not teach or suggest any specific type of memory, much less a read only memory.

Thus, Appellants submit that the cited portions of Schmidt teach programmable memories, which do not read upon Appellants' claimed "read only memory." Moreover, the

cited portions of Rodriguez and Agness do not teach or suggest any type of memory. Thus, in combination, the cited portions of the cited references teach either a programmable memory or are silent regarding memory type, neither of which teaches or suggests a read only memory. However, assuming arguendo that the cited portions of either Rodriguez or Agness did contain a teaching or suggestion of a "read only memory," which Appellants do not concede, it would be improper to combine such a teaching with the teachings of the primary reference, Schmidt.

For example, according to MPEP 2143.01, Section V., any attempt to substitute a read only memory (e.g., from any reference) for the memory of the primary reference (e.g., memory 58 of Schmidt) is not proper because a read only memory would render Schmidt unsatisfactory for its intended purpose of allowing users to program and dial phone numbers of their choosing so long as the mobile station is not roaming. For example, the "Background of the Invention" of Schmidt (col. 1, lines 48-54) specifically indicates that a potentially undesirable situation would be created if a user was restricted to only dialing out to phone numbers stored in the memory, which would be the case if a read only memory were utilized in conjunction with the teachings of Schmidt. Thus, utilizing a read only memory in combination with Schmidt would render Schmidt unsatisfactory for its intended purpose. Therefore, Appellants submit that a "read only memory" from any reference may not be properly combined with the cited portions of Schmidt in an attempt to render Appellants' claim 63 obvious.

Furthermore, Appellants respectfully submit that the cited portions of Schmidt do not teach or suggest "storing in a read only memory of the wireless communication device one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information," as recited in claim 63. Rather, Schmidt, col. 7, lines 51-54, describes storing a home system ID number that does not comprise any absolute or relative position information. In contrast to claim 63, the cited portions of Schmidt describe calculating, in real time, whether the current wireless communication system ID number matches the stored home wireless communication system ID number. The cited portions of Schmidt require that the current system ID number is received by the mobile station over the air via the control channel of the wireless communication system. (See Schmidt, col. 7, lines 47-58). Thus, the cited portions of Schmidt describe a numerical matching calculation and do not teach or suggest any notion of storing one or more authorized geographic areas in read only memory where each authorized geographic area comprises absolute or relative position information.

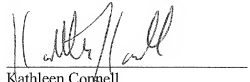
Thus, the cited portions of Schmidt do not store any authorized geographic areas that each comprise absolute or relative position information. Rather, the cited portions of Schmidt describe storing the home system ID number, which does not contain absolute or relative position information. The Examiner does not cite to Rodriguez or Agness to show this limitation. Therefore, none of the cited portions of the cited references teach or suggest storing authorized geographic areas in a read only memory, each of the authorized geographic areas comprising absolute or relative position information.

In light of the foregoing, Appellants submit that the cited portions of Schmidt, Rodriguez, and Agness fail to teach or suggest every limitation of claim 63. Accordingly, Appellants respectfully request reversal of this rejection.

CONCLUSION

Appellants respectfully submit that the pending claims are allowable and that the rejections should be reversed.

Respectfully Submitted,



Dated: 7/13/2010

Kathleen Connell
Reg. No. 45,344

Kathleen Connell
Kyocera International Inc.
Attn: Patent Department
P.O. Box 928289
San Diego, California 92192-8289
Tel: (858) 882-2196
Fax: (858) 882-4221

APPENDIX

Claims

1-45. (Canceled)

46. A wireless communication device, comprising:

a read only memory for storing a list comprising area codes, at least a portion of which are authorized area codes, the read only memory also for storing one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information;

a user interface for accepting an inputted phone number having an area code;

a global positioning system (GPS) device for determining a current location of the wireless communication device;

a controller connected to the read only memory, the user interface, and the GPS device, the controller configured to determine whether the inputted phone number will incur a charge based on an evaluation of at least the area code, the current location, and the list comprising area codes and the one or more authorized geographic areas stored in the read only memory, wherein the controller is further configured to permit placement of a phone call to the inputted phone number only if the area code is an authorized area code and the current location of the wireless communication device is within an authorized geographic area.

47. (Canceled)

48. The wireless communication device of claim 46, wherein at least a portion of the list comprising area codes are unauthorized area codes; and

wherein the controller is configured to block a phone call to the inputted number if the area code is an unauthorized area code or the current location of the wireless communication device is not within an authorized geographic area.

49-58. (Canceled)

59-62. (Withdrawn)

63. A method for restricting a requested communication on a wireless communication device, comprising:

storing in a read only memory of the wireless communication device one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position information;

storing in the read only memory of the wireless communication device one or more authorized telephone number area codes;

receiving the requested communication, wherein the requested communication comprises a telephone number having an area code;

determining whether the area code of the requested communication telephone number is an authorized telephone number area code stored in the read only memory of the wireless communication device;

identifying a current location of the wireless communication device;

determining whether the current location of the wireless communication device is within an authorized geographic area stored in the read only memory of the wireless communication device;

initiating a call to the telephone number in the requested communication only if the area code of the requested communication telephone number is an authorized telephone number area code and the current location of the wireless communication device is within an authorized geographic area.

64. The method of claim 63, wherein the current location is an absolute global positioning system position.

65. The method of claim 63, wherein the current location is a relative global positioning system position.

66. The method of claim 63, wherein the determining whether the area code of the requested communication telephone number is an authorized telephone number area code comprises evaluating local toll charges.

67. The method of claim 63, wherein the determining whether the area code of the requested communication telephone number is an authorized telephone number area code comprises evaluating long distance charges.

APPENDIX

Evidence

1) U.S. Patent No. 6,208,872 (Schmidt)

2) U.S. Patent No. 7,212,802 (Rodriguez)

3) U.S. Patent No. 6,556,819 (Irvin)

4) U.S. Patent No. 6,799,052 (Agness)

5) Final Office Action dated October 20, 2009

US006208872B1

(12) **United States Patent**
Schmidt

(10) **Patent No.: US 6,208,872 B1**
(45) **Date of Patent: Mar. 27, 2001**

(54) **METHOD AND APPARATUS FOR INHIBITION OF CALLS WHILE ROAMING**

(75) Inventor: **Paul Schmidt**, Lynchburg, VA (US)

(73) Assignee: **Ericsson Inc.**, Research Triangle Park, NC (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(h) by 0 days.

(21) Appl. No.: **09/148,128**

(22) Filed: **Sep. 4, 1998**

(51) **Int. Cl.**[7] **H04Q 7/28**

(52) **U.S. Cl.** **455/518**; 455/416; 455/432; 455/519; 455/520

(58) **Field of Search** 455/518, 519, 455/520, 432, 458, 416, 414, 517, 415

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,142,654		8/1992	Sonberg et al. .	
5,465,391	*	11/1995	Toyryla	455/518
5,506,837		4/1996	Söllner et al. .	
5,513,381	*	4/1996	Sasuta	455/520
5,970,417	*	10/1999	Toyryla et al.	455/520
6,097,942	*	8/2000	Laiho	455/519

FOREIGN PATENT DOCUMENTS

0788298	*	2/1997 (EP)	455/432
0 788 287		8/1997 (EP) .	
WO 93 03585		2/1993 (WO) .	

* cited by examiner

Primary Examiner—Lee Nguyen
Assistant Examiner—Simon Nguyen
(74) *Attorney, Agent, or Firm*—Wood, Phillips, VanSanten, Clark & Mortimer

(57) **ABSTRACT**

A method of selectively connecting group phone calls to a roaming mobile station. A mobile station is provided for use in a wireless communication system for selectively originating and receiving group phone calls. The mobile station includes a memory storing a plurality of group phone numbers for each group of which the mobile station is a member, and roam originate and receive enable flags for each group phone number. The roam originate and receive enable flags are selectively settable between first and second states to either permit or prohibit group calls to be originated from, or received at, the mobile station while the mobile station is roaming.

20 Claims, 5 Drawing Sheets

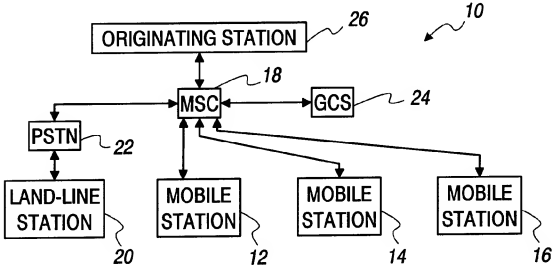


Fig. 1

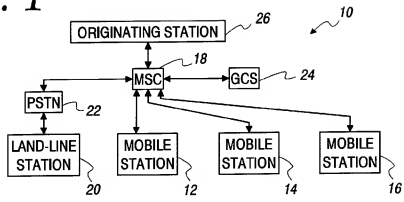

ORIGINATING STATION
26
10
18
MSC
GCS
24
PSTN
22
LAND-LINE STATION
20
MOBILE STATION
12
MOBILE STATION
14
MOBILE STATION
16

Fig. 2

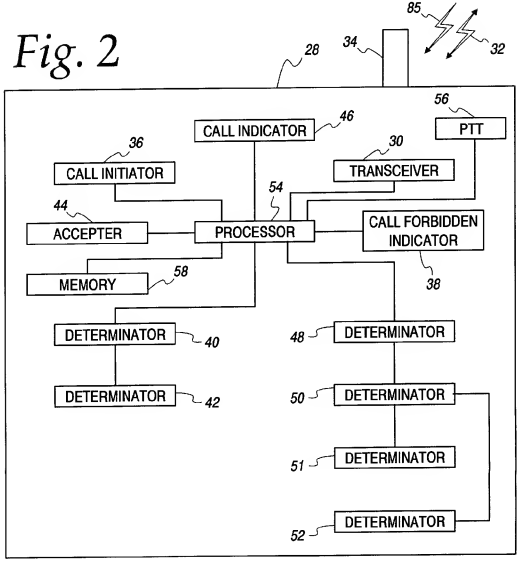

85
34
32
28
56
PTT
CALL INDICATOR
46
36
CALL INITIATOR
30
TRANSCEIVER
54
44
ACCEPTER
PROCESSOR
CALL FORBIDDEN INDICATOR
38
MEMORY
58
DETERMINATOR
40
DETERMINATOR
42
48
DETERMINATOR
50
DETERMINATOR
51
DETERMINATOR
52
DETERMINATOR

Fig. 3

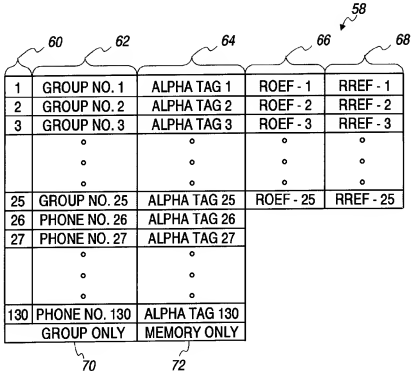

58
60
62
64
66
68
1 GROUP NO. 1 ALPHA TAG 1 ROEF - 1 RREF - 1
2 GROUP NO. 2 ALPHA TAG 2 ROEF - 2 RREF - 2
3 GROUP NO. 3 ALPHA TAG 3 ROEF - 3 RREF - 3
25 GROUP NO. 25 ALPHA TAG 25 ROEF - 25 RREF - 25
26 PHONE NO. 26 ALPHA TAG 26
27 PHONE NO. 27 ALPHA TAG 27
130 PHONE NO. 130 ALPHA TAG 130
GROUP ONLY
MEMORY ONLY
70
72

Fig. 4

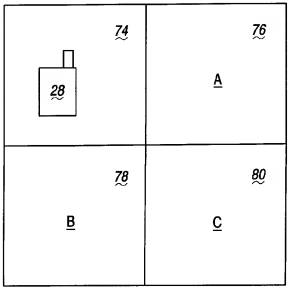

74
76
28
A
78
80
B
C

Fig. 5

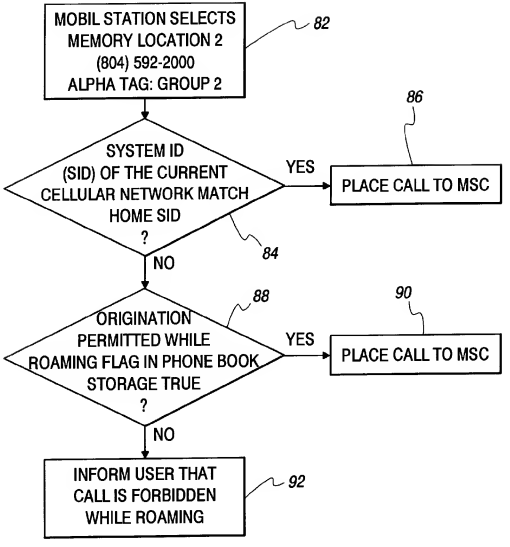
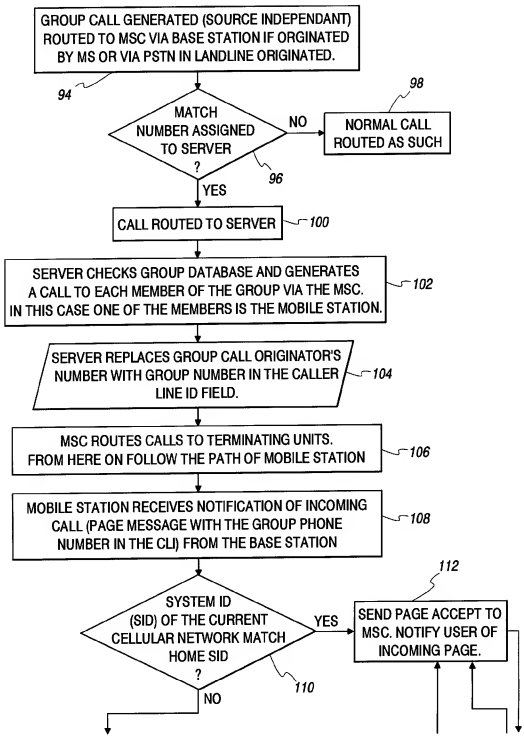

MOBIL STATION SELECTS MEMORY LOCATION 2 (804) 592-2000 ALPHA TAG: GROUP 2
82
SYSTEM ID (SID) OF THE CURRENT CELLULAR NETWORK MATCH HOME SID ?
84
YES
86
PLACE CALL TO MSC
NO
ORIGINATION PERMITTED WHILE ROAMING FLAG IN PHONE BOOK STORAGE TRUE ?
88
YES
90
PLACE CALL TO MSC
NO
INFORM USER THAT CALL IS FORBIDDEN WHILE ROAMING
92

Fig. 6a


GROUP CALL GENERATED (SOURCE INDEPENDANT) ROUTED TO MSC VIA BASE STATION IF ORGINATED BY MS OR VIA PSTN IN LANDLINE ORIGINATED.
94
MATCH NUMBER ASSIGNED TO SERVER ?
96
NO
98
NORMAL CALL ROUTED AS SUCH
YES
CALL ROUTED TO SERVER
100
SERVER CHECKS GROUP DATABASE AND GENERATES A CALL TO EACH MEMBER OF THE GROUP VIA THE MSC. IN THIS CASE ONE OF THE MEMBERS IS THE MOBILE STATION.
102
SERVER REPLACES GROUP CALL ORIGINATOR'S NUMBER WITH GROUP NUMBER IN THE CALLER LINE ID FIELD.
104
MSC ROUTES CALLS TO TERMINATING UNITS. FROM HERE ON FOLLOW THE PATH OF MOBILE STATION
106
MOBILE STATION RECEIVES NOTIFICATION OF INCOMING CALL (PAGE MESSAGE WITH THE GROUP PHONE NUMBER IN THE CLI) FROM THE BASE STATION
108
SYSTEM ID (SID) OF THE CURRENT CELLULAR NETWORK MATCH HOME SID ?
110
YES
112
SEND PAGE ACCEPT TO MSC. NOTIFY USER OF INCOMING PAGE.
NO

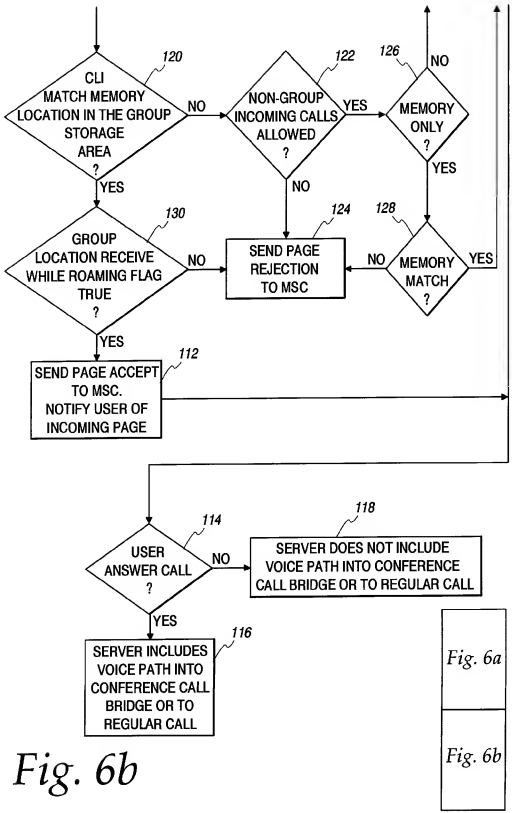


Fig. 6b

Fig. 6a

Fig. 6b

METHOD AND APPARATUS FOR INHIBITION OF CALLS WHILE ROAMING

FIELD OF THE INVENTION

The present invention is directed toward receiving and originating calls in a wireless communication system and, more particularly, toward a method and apparatus for inhibiting the receipt and/or origination of calls by a roaming mobile station.

BACKGROUND OF THE INVENTION

The operation of cellular communication systems is fairly well known. A mobile station, such as a cellular telephone, has the ability to roam to other cellular systems, i.e., a cellular system other than its home system (the home system being the cellular system in which the user of the mobile station has an account), and place and/or receive calls. However, a roaming mobile station will incur roaming charges, and possibly long distance charges, when placing or receiving calls of any type, i.e., calls to/from land-lines, calls to/from other mobile stations, calls to/from groups, etc. Such roaming charges may be as high as 10× the normal rate per minute charge that would be incurred if the mobile station were communicating in its home system.

In the case of a company providing mobile stations to its employees for work use, the company may not wish the employee to originate or receive calls when the employee takes a mobile station out of its home system. Presently, a company has the following choices in how it may limit calls originating from its mobile stations: (1) Allow all (can dial any number); (2) Restrict all (can't dial any number); (3) Local calls+800# only (thus restricts all roaming calls); (4) Memory only; (5) Local calls+800#+ Memory only; (6) Restrict international calls, (7) Restrict 900# calls, and (8) Restrict operator calls.

With respect to receiving calls at the mobile station, a company has only two choices, namely, it can either (1) allow all incoming calls, or (2) prohibit all incoming calls.

Thus, a company attempting to restrict the use of its mobile stations by its employees is limited in its choices. In order to prohibit a mobile station from originating roaming calls, the company's only choice is to limit the mobile station to originating local and 800# calls. However, this means that the employee cannot make any long distance calls from the mobile station even though the company may wish the employee to be able to dial certain particular numbers at any time. While the company could store these particular numbers in the memory of the mobile station and restrict the employee to the memory only dial lock feature, this restricts the employee to dialing out to only the phone numbers stored in the memory, which may also be undesirable to the company.

A company wishing to restrict the receipt of calls by its mobile stations while they are roaming has even fewer choices. The company must either allow the mobile station to receive all incoming calls, including roaming calls, or restrict all calls to the mobile station, thus rendering the employee unreachable through his/her mobile station.

The present invention is directed toward overcoming one or more of the above-mentioned problems.

SUMMARY OF THE INVENTION

A method is provided for placing a phone call from an originating mobile station to a group of receiving stations collectively having a group identification number, the method including the steps of (a) initiating a call at the originating mobile station to a selected group identification number, (b) determining if the originating mobile station is in a roaming condition, (c) if the originating mobile station is roaming as determined at step (b), determining whether the originating mobile station is permitted to place calls to the selected group identification number while roaming, and (d) if the originating mobile station is permitted to place calls to the selected group identification number while roaming as determined at step (c), placing a call to a selected group of receiving stations defined by the selected group identification number.

In one form, the method further includes the step of (e) if the originating mobile station is not permitted to place calls to the selected group identification number while roaming as determined at step (c), informing a user that the call is forbidden while roaming.

In another form, there are a plurality of wireless communication systems each having a discrete system identification number and distinct geographical boundaries, one of said plurality of wireless communication systems being a home wireless communication system associated with the originating mobile station, with the originating mobile station physically within the geographical boundaries of the home wireless communication system in a non-roaming condition, the home wireless communication system having a home system identification number stored in a memory in the originating mobile station, and wherein step (b) includes the steps of (b1) receiving, at the originating mobile station, a system identification number of a wireless communication system within which the originating mobile station has initiated a call to the selected group identification number, and (b2) determining if the received system identification number matches the home system identification number.

In still another form, the method further includes the steps of (f) storing a plurality of group identification numbers in a memory at the originating mobile station, one of said plurality of group identification numbers being the selected group identification number, and (g) storing a roamenable flag in the memory for each of the plurality of group identification numbers, each roam-enable flag selectively settable between (a) a first state permitting calls to a particular group identification number with which it is associated with the originating mobile station in a roaming condition, and (b) a second state prohibiting calls to the particular group identification number with which it is associated with the originating mobile station in a roaming condition, wherein step (c) comprises the step of checking the state of the roam-enable flag associated with the selected group identification number.

A method is also provided for connecting a phone call from an originating station having an originating identification number to a plurality of receiving stations collectively having a group identification number, the method including the steps of (a) initiating a call request at an originating station to a selected group identification number, (b) receiving the call request, with the selected group identification number, at a Group Call Server (GCS), (c) routing a page message to each of a plurality of receiving stations included within the selected group, (d) receiving the page message at a select one of the plurality of receiving stations, said select receiving station comprising a mobile station, (e) determining if the select mobile receiving station is in a roaming condition, (f) if the select mobile receiving station is roaming as determined at step (e), determining if the received page message defines a group call, (g) if the received page message defines a group call as determined at step (f),

determining whether the select mobile receiving station is permitted to receive calls from the selected group identification number while roaming, and (h) accepting the call from the originating station if all of the conditions in steps (e)–(g) are determined to be present.

In one form, the step of accepting the call from the originating station includes the step of activating an indicator at the select mobile receiving station alerting a user to an incoming call.

In another form, the activating step generates a ringing tone at the select mobile receiving station.

In another form, there are a plurality of wireless communication systems each having a discrete system identification number and distinct geographical boundaries, one of said plurality of wireless communication systems being a home wireless communication system associated with the select mobile receiving station, with the select mobile receiving station physically within the geographical boundaries of the home wireless communication system in a non-roaming condition, the home wireless communication system having a home system identification number stored in a memory in the select mobile receiving station, and wherein step (e) includes the steps of (e1) receiving, at the select mobile receiving station, a system identification number of a wireless communication system within which the select mobile receiving station has received the page message, and (e2) determining if the received system identification number matches the home system identification number.

In yet another form, the originating identification number is included in a Caller Line Identification (CLI) field of the initiated call request, wherein the method further includes the steps of (i) replacing the originating identification number with the selected group identification number in the CLI field at the GCS, and (j) storing, in a predetermined memory location at the select mobile receiving station, group identification numbers for each group of which the select mobile receiving station is a member, wherein step (f) comprises the step of determining if the selected group identification number in the CLI field of the page message matches any of the plurality of group identification numbers stored in the predetermined memory location at the select mobile receiving station.

In still another form, the method further includes the steps of (k) storing, in a memory at the select mobile receiving station, group identification numbers for each group of which the select mobile receiving station is a member, and (l) storing a roam-enable flag in the memory for each of the group identification numbers, each roam-enable flag selectively settable between (a) first state permitting calls from a particular group identification number to be received at the select mobile receiving station with the select mobile receiving station in a roaming condition, and (b) a second state prohibiting calls from the particular group identification number to the select mobile receiving station with the select mobile receiving station in a roaming condition, wherein step (g) comprises the step of checking the state of the roam-enable flag associated with the selected group identification number.

A method is also provided for connecting a phone call from an originating mobile station having an originating identification number to a group of receiving stations collectively having a group identification number, the method includes the steps of (a) initiating a call request at the originating mobile station to a selected group identification number, (b) determining if the originating mobile station is in a roaming condition, (c) if the originating mobile station is roaming as determined at step (b), determining whether the originating mobile station is permitted to place calls to the selected group identification number while roaming, and (d) if the originating mobile station is permitted to place calls to the selected group identification number while roaming as determined at step (c), (d1) sending the initiated call request to a Group Call Server (GCS), (d2) receiving the call request, with the selected group identification number, at the GCS, (d3) routing a page message to each of a group of receiving stations included within the selected group, (d4) receiving the page message at a select one of the group of receiving stations, said select receiving station comprising a mobile station, (d5) determining if the select mobile receiving station is in a roaming condition, (d6) if the select mobile receiving station is roaming as determined at step (d5), determining if the received page message defines a group call, (d7) if the received page message defines a group call as determined at step (d6), determining whether the select mobile receiving station is permitted to receive calls from the selected group identification number while roaming, and (d8) accepting the call from the originating mobile station if all of the conditions in steps (d5)–(d7) are determined to be present.

A mobile station is also provided for use in a wireless communication system for selectively placing group phone calls to a plurality of receiving stations included within a selected group, the mobile station including a memory storing a plurality of group phone numbers and a roam origination enable flag for each group phone number, said roam origination enable flags selectively settable between (a) a first state permitting calls to a particular group phone number with the mobile station in a roaming condition, and (b) a second state prohibiting calls to the particular group phone number with the mobile station in a roaming condition, a call initiator operable by a user to initiate a call to one of the plurality of group phone numbers stored in the memory, a first determinator determining whether the mobile station is in a roaming condition, a second determinator adapted to determine the state of the roam origination enable flag associated with said one of the plurality of group phone numbers, and a processor adapted to block call transmission responsive to the first and second determinators.

A mobile station is provided for use in a wireless communication system for selectively receiving group phone calls from an originating station, the mobile station including a memory storing a plurality of group phone numbers for each group of which the mobile station is a member and a roam receive enable flag for each group phone number, said roam receive enable flags selectively settable between (a) a first state permitting calls from a particular group phone number to be received at the mobile station with the mobile station in a roaming condition, and (b) a second state prohibiting calls from the particular group phone number to be received at the mobile station with the mobile station in a roaming condition, a transceiver adapted to receive a signal, including a group phone number, indicating that a call has been placed to the mobile station, a first determinator adapted to determine if the mobile station is in a roaming condition, a second determinator adapted to determine if the received signal defines a group call, a third determinator adapted to determine the state of the roam receive enable flag associated with the received group phone number, and an accepter adapted to accept the call responsive to the first, second and third determinators.

It is an object of the present invention to selectively control the use of a mobile station.

It is a further object of the present invention to permit an owner to selectively control the use of its mobile stations by others.

It is yet a further object of the present invention to restrict an employee's personal use of employer owned mobile stations.

It is still a further object of the present invention to minimize costs associated with employer owned mobile stations.

Other aspects, objects and advantages of the present invention can be obtained from a study of the application, the drawings, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of a standard communication system in which the present invention may be utilized;

FIG. **2** is a block diagram of the inventive mobile station;

FIG. **3** is an expanded diagram of the memory shown in FIG. **2**;

FIG. **4** depicts four separate wireless communication systems and illustrates roaming of the mobile station in separate systems;

FIG. **5** is a flow chart illustrating call origination at the mobile station according to the present invention; and

FIGS. **6***a–b* is a flow chart illustrating call receipt by the mobile station according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. **1**, a communication system, shown generally at **10**, is illustrated in which the present invention may be utilized. Mobile stations **12**, **14**, **16** may communicate with one another via a Mobile Switching Center (MSC) **18**. For convenience, the base station and base station controller, which establish the communication link between the mobile stations **12**, **14**, **16** and the MSC **18** have been omitted. The mobile stations **12**, **14**, **16** may also communicate with a land-line station **20** via a Public Switching Telephone Network (PSTN) **22**.

A Group Call Server (GCS) **24** communicates with the MSC **18**. The GCS **24** is essentially a conference calling bridge and can be a shared resource among many MSC's **18** within the communication system **10**.

The GCS **24** permits group phone calls to be made between numerous terminating units, whether they be mobile stations, land-line phones, etc. A group phone call is essentially a conference call between at least three parties. A group may include land-line stations, mobile stations, and/or any type of communication device that has a dialable 10-digit number and is accessible through a cellular network and/or a PSTN. The GCS **24** has a group member database that includes each group phone number and a list of all of the individual phone numbers of the various members within the particular group.

Assume that a particular group includes mobile stations **12**, **14**, **16**, land-line station **20** and originating station **26** as its members. When the originating station **26** places a call to the group by dialing the group phone number, the group phone number is transmitted to the MSC **18**. The GCS **24** receives the group phone number from the MSC **18** and identifies the various members of the group in its database, and generates a separate call to each group member through the MSC **18**. The MSC **18** then routes the separate calls to each of the terminating units, namely, mobile stations **12**, **14**, **16** and land-line station **20**. As the call to each terminating unit is connected, the GCS **24** includes a voice path to the conference call bridge.

Referring to FIG. **2**, a mobile station according to the invention is shown at **28**. The mobile station **28** includes a transceiver **30** for transmitting and receiving communication signals **32** via antenna **34**; a call initiator **36** for initiating calls by a user; a call forbidden indicator **38** informing the user that a particular outgoing call is forbidden; determinators **40**,**42** utilized in determining which outgoing calls may be transmitted; an acceptor **44** permitting the mobile station **28** to accept incoming calls; a call indicator **46** informing the user that it has an incoming call; and determinators **48**,**50**, **51**,**52** utilized in determining which calls may be received by the mobile station **28**. Operation of all of the above-identified elements are controlled by a processor **54**.

The mobile station **28** may also includes a Push-To-Talk (PTT) button **56** permitting the mobile station **28** to be employed in much the same way as dispatch radios. For instance, transmission occurs when the PTT button **56** is depressed, which unmutes a microphone (not shown) and mutes a speaker (not shown) on the mobile station **28**, thus permitting the user to transmit a voice signal. When the PTT button **56** is released, the microphone is muted and the speaker is unmuted so that the user may listen to incoming voice signals.

The mobile station **28** also includes a memory **58** which is also controlled by the processor **54**. The memory **58** is a storage area utilized as a phone book where users may program both phone numbers and alphanumeric tags (alpha tags) (e.g., names) associated with these numbers. The memory **58** is preferably a non-volatile memory surviving power-up and power-down of the mobile station **28**.

FIG. **3** illustrates the structure of the memory **58**. The memory **58** includes a first area **60** for storing a memory location identified number. A second area **62** stores the phone numbers. As illustrated in FIG. **3**, the first twenty five memory locations have been allocated for group phone numbers, while the remaining memory locations (**26**–**130**) are utilized for conventional phone numbers, although other allocation schemes could be used with the present invention. A third area **64** stores the alpha tags associated with each phone number. The alpha tags are a string of alpha-numeric characters which are generally set by the user to readily identify particular phone numbers. A fourth area **66** stores a Roam Origination Enable Flag (ROEF) for each of the group phone numbers. The ROEF may be a binary bit having two states, "0" and "1". With the ROEF in state "1", roam origination is enabled and the mobile station **28** may place a group call to that particular group phone number while roaming. With the ROEF in state "0", roam origination is disabled and the mobile station **28** may not place a group call to that particular group phone number while roaming.

A fifth area **68** in the memory **58** stores the Roam Receive Enable Flag (RREF) for each group phone number. The RREF may also be a binary bit having two states, "0" and "1". With the RREF in state "1", roam receive is enabled and the mobile station **28** may accept a group call from that particular group phone number. With the RREF in state "0", roam receive is disabled and the mobile station **28** may not receive a group call from that particular group phone number. Of course, the enable and disable states of the ROEF and RREF may be reversed.

The memory **58** also stores a group only flag **70** and a memory only flag **72**. The group only **70** and memory only **72** flags are mutually exclusive in that only one is permitted

to be enabled at a given time. With the group only flag **70** enabled, the mobile station **28** may only receive calls from any group phone number stored in the memory **58** which has an associated RREF which is enabled (state "1"). With the group only flag **70** disabled, the mobile station **28** is not restricted from receiving group calls while roaming and therefore the calling number is not checked against the group numbers in memory area **62** when a call is received. Enabling the memory only flag **72** restricts the mobile station **28** to receiving call only from those phone numbers, group or standard, which are stored in the memory **58**. If the memory only flag **72** is disabled, no check is made against the numbers in memory area **62**. The group only **70** and memory only **72** flags include a binary bit.

It should be noted that the ROEF and RREF only come into play if the mobile station **28** is in a roaming condition. Roaming essentially means that the mobile station **28** is out of its home system. The concept of roaming is illustrated in FIG. **4**.

FIG. **4** depicts four separate wireless communication systems, or cellular systems, **74**,**76**,**78**,**80**. Each system **74**,**76**,**78**,**80** services a different geographical area and, accordingly, includes distinct geographical boundaries. When a mobile station is within the geographical boundaries of a particular communication system, it will use that particular communication system to transmit its calls.

To illustrate how roaming occurs, it is assumed that the mobile station **28** has system **74** as its home system; that is, the user of mobile station **28** has an account with communication system **74**. When the mobile station **28** travels outside of the geographical boundaries of system **74**, it is considered to be roaming. That is, if the mobile station **28** travelled to position A, it would be roaming in system **76**; if the mobile station **28** travelled to position B, it would be roaming in system **78**; and, similarly, if the mobile station **28** travelled to position C, it would be roaming in system **80**. The present invention is concerned with the transmission and receipt of calls when the mobile station **28** is in, for example, any of positions A, B or C, i.e., roaming.

Referring to FIGS. **1**, **2** and **5**, group call origination operates as follows. The mobile station **28**, via a user, selects one of the group phone numbers (e.g., Group No. **2**) from the memory **58** to which it desires to place a call (block **82**). This may be accomplished through either the call initiator **36** or the PTT button **56**. The determinator **40** then checks to see if the mobile station **28** is roaming (block **84**). The determinator **40** determines if the system ID number of the cellular network in which the mobile station **28** is currently located (the "current system ID number"), matches the system ID number of the mobile station's **28** home system (the "home system ID number"), which is conventionally stored in the mobile station **28** upon user opening an account. The current system ID number is received at the mobile station **28**, via signal **85**, as part of the overhead information, or bulletin board information, which is continuously provided over the air by the control channel of the various cellular networks. If the determinator **40** determines that the current system ID number matches the home system ID number, i.e., the mobile station **28** is in its home system, the group call is placed to the MSC **18** (block **86**) and is conventionally routed to all of the members in the group via the GCS **24**.

If the determinator **40** determines that the current system ID number does not match the home system ID number, i.e., the mobile station **28** is not in its home system and is roaming, then the determinator **42** determines the state of the ROEF (e.g., ROEF-2) for that particular group phone number. If the determinator **42** determines, at block **88**, that ROEF-2 is in state "1" permitting calls to Group No. **2** while roaming, the group call is routed to the MSC (block **90**) and is conventionally routed to the various members in the group via the GCS **24**. If the determinator **42** determines, at block **88**, that the ROEF-2 is in state "0" prohibiting calls to Group No. **2** while roaming, the processor **54** blocks the call and activates the call forbidden indicator **38** to inform the user that the call is forbidden while roaming (block **92**).

Referring to FIGS. **1**, **2** and **6***a*–*b*, receipt of group calls at the mobile station **28** operates as follows. First, a group call request is generated by a caller and is routed to the MSC **18** (block **94**). The group call may be generated by a mobile station or a land-line phone via the PSTN. The MSC **18** determines if the call is a group call by determining whether the received phone number matches any of the group phone numbers assigned to the GCS **24** (block **96**). If the received phone number does not match any of the group phone numbers assigned to the GCS **24**, the call is not a group call, but is rather a normal call and is conventionally routed to the desired party (block **98**).

If the call is determined to be group call at block **96**, it is routed to the GCS **24** (block **100**). The GCS **24** checks its group database and generates a call, or page message, to each member of the group via the MSC **18** (block **102**), with one of the members being mobile station **28**. The GCS **24** also replaces the group call originator's number (the number of the person who made the call) with the group phone number in the caller line ID field of the page message (block **104**). The caller line ID feature is a well-known feature which identifies to the cellular phone user, or to a land-line phone user if they have a caller line ID attachment device, who has originated an incoming call. The user to whom the call is destined learns the identity of the call originator through the caller line ID field, which includes the call originator's phone number, and which is transmitted to the destined user in the page message of an incoming call. The MSC **18** then routes the page messages to the various terminating units (block **106**), with the page messages now including the group phone number in the caller line ID field. The receipt of such a call by the mobile station **28** is as follows.

The mobile station **28** receives the page message from the MSC **18** indicating that it has an incoming call (block **108**). The page message includes the group phone number in the caller line ID field. Upon receipt thereof, the determinator **48** determines if the system ID number of the cellular network in which the mobile station **28** is currently located matches the system ID number of the mobile station's **28** home system (block **110**). This determination is performed in the same manner as previously described with respect to determinator **40**. If a match is determined at block **110**, the mobile station **28** is not roaming and will send a page accept message back to the MSC **18** and will notify the user of an incoming page via the call indicator **46** (block **112**). The call indicator **46** may be a flashing light, a bell generating a ringing tone, a vibrating element or any other device alerting the user to an incoming phone call. Depending on whether or not the user answers the call (block **114**), the GCS **24** will either include a voice path for the mobile station **28** into the conference calling bridge (block **116**), or will not include a voice path for the mobile station **28** into the conference calling bridge (block **118**).

If determinator **48** determines that the system is roaming at block **110**, determinator **50** then determines whether the call is a group call (block **120**). The determinator **50**

determines if the phone number in the caller line ID field of the page message matches any of the group phone numbers stored in the group storage location (locations **1–25** in the memory **58**). For example, since the group phone numbers for the mobile station **28** are stored in memory locations **1–25**, if the phone number in the caller line ID field of the page message matches any of the group phone numbers stored in memory locations **1–25**, the mobile station is receiving a group call.

If it is decided at block **120** that the incoming call is not a group call, then determinator **51** determines if non-group incoming calls are allowed while roaming (block **122**) by determining the state of the group only flag **70** stored in the memory **58**. If it is determined that non-group incoming calls are not allowed when roaming at block **122**, a page rejection message is sent to the MSC **18** (block **124**) and the call request to the mobile station **28** is terminated.

If it is determined that non-group calls may be received while roaming (at block **122**), the determinator **51** then determines if incoming calls are restricted to those stored in the memory **58** (block **126**) by determining the state of the memory only flag **72**. If the memory only flag **72** is determined to be disabled at block **126** (i.e., it does not limit incoming calls), a page accept message is sent to the MSC **18** (block **112**) and, depending whether the user answers the call (block **114**), they are either included (block **116**) or not included (block **118**) in the conference call bridge.

If the memory only flag **72** is determined to be enabled at block **126**, the determinator **51** determines if the call is from a phone number stored in the memory **58** (block **128**) by determining if the phone number in the caller line ID field of the page message matches any of the phone numbers stored in the memory **58**. If a match is found (at block **128**), a page accept message is sent to the MSC **18** (block **112**) and, depending whether the user answers the call (block **114**), a voice path to the user is either established (block **116**) or not established (block **118**) to the call. If a match is not found at block **128**, a page rejection message is sent to the MSC **18** (block **124**) and the call request to the mobile station **28** is terminated.

If the call is determined to be a group call at block **120**, then the determinator **52** determines if the mobile station **28** is permitted to receive that particular group call while roaming (block **130**) by determining the state of the RREF for that particular group phone number. If it is determined that the RREF is disabled (at block **130**), prohibiting the receipt of calls from that particular group phone number while the mobile station **28** is roaming, a page rejection message is sent to the MSC (block **124**) and the call request to the mobile station **28** is terminated. If it is determined that the RREF is enabled (at block **130**), indicating that the mobile station **28** is permitted to receive calls from that particular group phone number while roaming, a page accept message is sent to the MSC **18** via acceptor **44** and the user is notified of the incoming page via the call indicator **46** (block **112**). Depending on whether the user answers the call (block **114**), they are either included (block **116**) or not included (block **118**) in the conference call bridge.

While the invention has been described with particular reference to the drawings, it should be understood that various modifications could be made without departing from the spirit and scope of the present invention.

What is claimed is:

1. A method of placing a phone call from an originating mobile station to a group of receiving stations collectively having a group identification number, said method comprising the steps of:

(a) providing a first permission for said originating mobile station to place calls to a first group identification number while roaming and providing a second permission for said origination mobile station to place calls to a second group identification number;

(b) initiating a call at the originating mobile station to a selected one of said first and second group indentification numbers;

(c) determining if the originating mobile station is in a roaming condition;

(d) if the originating mobile station is roaming as determined at step (c), determining whether said first or second permission associated with said selected one of said group identification numbers permits the originating mobile station to place calls to the selected group identification number while roaming; and

(e) if the originating mobile station is permitted to place calls to the selected one of said group identification numbers while roaming as determined at step (d), placing a call to a selected group of receiving stations defined by the selected group identification number.

2. The method of claim **1**, further comprising the step of:

(f) if the originating mobile station is not permitted to place calls to the selected one of said group identification numbers while roaming as determined at step (d), informing a user that the call is forbidden while roaming.

3. A method of placing a phone call from an originating mobile station to a group of receiving stations collectively having a group identification number, wherein there are a plurality of wireless communication systems each having a discrete system identification number and distinct geographical boundaries, one of said plurality of wireless communication systems being a home wireless communication system associated with the originating mobile station, with the originating mobile station physically within the geographical boundaries of the home wireless communication system in a non-roaming condition, the home wireless communication system having a home system identification number stored in a memory in the originating mobile station, said method comprising the steps of:

(a) initiating a call at the originating mobile station to a selected group identification number;

(b) determining if the originating mobile station is in a roaming condition by receiving, at the originating mobile station, a system identification number of a wireless communication system within which the originating mobile station has initiated a call to the selected group identification number, and determining if the received system identification number matches the home system identification number;

(c) if the originating mobile station is roaming as determined at step (b), determining whether the originating mobile station is permitted to place calls to the selected group identification number while roaming; and

(d) if the originating mobile station is permitted to place calls to the selected group identification number while roaming as determined at step (c), placing a call to a selected group of receiving stations defined by the selected group identification number.

4. A method of placing a phone call from an originating mobile station to a group of receiving stations collectively having a group identification number, said method comprising the steps of:

(a) initiating a call at the originating mobile station to a selected group identification number;

(b) determining if the originating mobile station is in a roaming condition;

(c) if the originating mobile station is roaming as determined at step (b), determining whether the originating mobile station is permitted to place calls to the selected group identification number while roaming; and

(d) if the originating mobile station is permitted to place calls to the selected group identification number while roaming as determined at step (c), placing a call to a selected group of receiving stations defined by the selected group identification number;

(e) storing a plurality of group identification numbers in a memory at the originating mobile station, one of said plurality of group identification numbers being the selected group identification number; and

(f) storing a roam-enable flag in the memory for each of the plurality of group identification numbers, each roam-enable flag selectively settable between (a) a first state permitting calls to a particular group identification number with which it is associated with the originating mobile station in a roaming condition, and (b) a second state prohibiting calls to the particular group identification number with which it is associated with the originating mobile station in a roaming condition,

wherein step (c) comprises the step of checking the state of the roam-enable flag associated with the selected group identification number.

5. A method of connecting a phone call from an originating station having an originating identification number to a plurality of receiving stations collectively having a group identification number, said method comprising the steps of:

(a) providing a first permission for a select one of said plurality of receiving stations to receive calls to a first group identification number while roaming and providing a second permission for said select receiving station to receive calls to a second group identification number;

(b) initiating a call request at an originating station to a selected one of said group identification numbers;

(c) receiving the call request, with the selected group identification number, at a Group Call Server (GCS);

(d) routing a page message to each of a plurality of receiving stations included within the selected group;

(e) receiving the page message at the select one of the plurality of receiving stations, said select receiving station comprising a mobile station;

(f) determining if the select mobile receiving station is in a roaming condition;

(g) if the select mobile receiving station is roaming as determined at step (f), determining if the received page message defines a group call;

(h) if the received page message defines a group call as determined at step (g), determining whether said first or second permission associated with said selected one of said group identification numbers permits the select mobile receiving station to receive calls from the selected group identification number while roaming; and

(i) accepting the call from the originating station if all of the conditions in steps (f)–(h) are determined to be present.

6. The method of claim **5**, wherein the step of accepting the call from the originating station comprises the step of activating an indicator at the select mobile receiving station alerting a user to an incoming call.

7. The method of claim **6**, wherein the activating step generates a ringing tone at the select mobile receiving station.

8. A method of connecting a phone call from an originating station having an originating identification number to a plurality of receiving stations collectively having a group identification number, wherein there are a plurality of wireless communication systems each having a discrete system identification number and distinct geographical boundaries, one of said plurality of wireless communication systems being a home wireless communication system associated with the select mobile receiving station, with the select mobile receiving station physically within the geographical boundaries of the home wireless communication system in a nonroaming condition, the home wireless communication system having a home system identification number stored in a memory in the select mobile receiving station, said method comprising the steps of:

(a) initiating a call request at an originating station to a selected group identification number;

(b) receiving the call request, with the selected group identification number, at a Group Call Server (GCS);

(c) routing a page message to each of a plurality of receiving stations included within the selected group;

(d) receiving the page message at a select one of the plurality of receiving stations, said select receiving station comprising a mobile station;

(e) determining if the select mobile receiving station is in a roaming condition by receiving, at the select mobile receiving station, a system identification number of a wireless communication system within which the select mobile receiving station has received the page message, and determining if the received system identification number matches the home system identification number;

(f) if the select mobile receiving station is roaming as determined at step (e), determining if the received page message defines a group call;

(g) if the received page message defines a group call as determined at step (f), determining whether the select mobile receiving station is permitted to receive calls from the selected group identification number while roaming; and

(h) accepting the call from the originating station if all of the conditions in steps (e)–(g) are determined to be present.

9. A method of connecting a phone call from an originating station having an originating identification number to a plurality of receiving stations collectively having a group identification number, said originating identification number being included in a Caller Line Identification (CLI) field of the initiated call request, said method comprising the steps of:

(a) initiating a call request at an originating station to a selected group identification number;

(b) receiving the call request, with the selected group identification number, at a Group Call Server (GCS);

(c) routing a page message to each of a plurality of receiving stations included within the selected group;

prior to or during step (c), replacing the originating identification number with the selected group identification number in the CLI field at the GCS;

(d) receiving the page message at a select one of the plurality of receiving stations, said select receiving station comprising a mobile station;

(e) determining if the select mobile receiving station is in a roaming condition;

(f) if the select mobile receiving station is roaming as determined at step (e), determining if the received page message defines a group call;

(g) if the received page message defines a group call as determined at step (f), determining whether the select mobile receiving station is permitted to receive calls from the selected group identification number while roaming;

(h) accepting the call from the origioating station if all of the conditions in steps (e)–(g) are determined to be present; and

storing, in memory at the select mobile receiving station, group identification numbers for each group of which the select mobile receiving station is a member,

wherein step (f) comprises the step of determining if the selected group identification number in the CLI field of the page message matches any of the group identification numbers stored in the memory at the select mobile receiving station.

10. A method of connecting a phone call from an originating station having an originating identification number to a plurality of receiving stations collectively having a group identification number, said method comprising the steps of:

(a) storing, in a memory at the select mobile receiving station, group identification numbers for each group of which the select mobile receiving station is

(b) storing a roam-enable flag in the memory for each group identification number, each roam-enable flag selectively settable between (A) first state permitting calls from a particular group identification number to be received at a select one of the mobile receiving stations with the select mobile receiving station in a roaming condition, and (B) a second state prohibiting calls from the particular group identification number to the select mobile receiving station with the select mobile receiving station in a roaming condition, a member;

(c) initiating a call request at an originating station to a selected group identification number;

(d) receiving the call request, with the selected group identification number, at a Group Call Server (GCS);

(e) routing a page message to each of a plurality of receiving stations included within the selected group;

(f) receiving the page message at the select one of the plurality of receiving stations, said select receiving station comprising a mobile station;

(g) determining if the select mobile receiving station is in a roaming condition;

(h) if the select mobile receiving station is roaming as determined at step (g), determining if the received page message defines a group call;

(i) if the received page message defines a group call as determined at step (h), determining whether the select mobile receiving station is permitted to receive calls from the selected group identification number while roaming; and

(j) accepting the call from the originating station if all of the conditions in steps (g)–(i) are determined to be present;

wherein step (i) comprises the step of checking the state of the roam-enable flag associated with the selected group identification number.

11. A method of connecting a phone call from an originating mobile station having an originating identification number to a group of receiving stations collectively having a group identification number, said method comprising the steps of:

(a) initiating a call request at the originating mobile station to a selected group identification number;

(b) determining if the originating mobile station is in a roaming condition;

(c) if the originating mobile station is roaming as determined at step (b), determining whether the originating mobile station is permitted to place calls to the selected group identification number while roaming; and

(d) if the originating mobile station is permitted to place calls to the selected group identification number while roaming as determined at step (c):

(d1) sending the initiated call request to a Group Call Server (GCS);

(d2) receiving the call request, with the selected group identification number, at the GCS;

(d3) routing a page message to each of a group of receiving stations included within the selected group;

(d4) receiving the page message at a select one of the group of receiving stations, said select receiving station comprising a mobile station;

(d5) determining if the select mobile receiving station is in a roaming condition;

(d6) if the select mobile receiving station is roaming as determined at step (d5), determining if the received page message defines a group call;

(d7) if the received page message defines a group call as determined at step (d6), determining whether the select mobile receiving station is permitted to receive calls from the selected group identification number while roaming; and

(d8) accepting the call from the originating mobile station if all of the conditions in steps (d5)–(d7) are determined to be present or if the condition in step (d5) is determined to be not present.

12. A mobile station for use in a wireless communication system for selectively placing group phone calls to a plurality of receiving stations included within a selected group, said mobile station comprising:

a memory storing a plurality of group phone numbers and a roam origination enable flag for each group phone number, said roam origination enable flags selectively settable between (a) a first state permitting calls to a particular group phone number with the mobile station in a roaming condition, and (b) a second state prohibiting calls to the particular group phone number with the mobile station in a roaming condition;

a call initiator operable by a user to initiate a call to one of the plurality of group phone numbers stored in the memory;

a first determinator determining whether the mobile station is in a roaming condition;

a second determinator adapted to determine the state of the roam origination enable flag associated with said one of the plurality of group phone numbers; and

a processor adapted to block call transmission responsive to the first and second determinators.

13. The mobile station of claim **12**, further comprising a call forbidden indicator responsive to the processor blocking a call to inform the user that the call is forbidden.

14. The mobile station of claim **12**, usable in a plurality of wireless communication systems each having a discrete

system identification number and distinct geographical boundaries, one of said plurality of wireless communication systems being a home wireless communication system associated with the mobile station, with the mobile station physically within the geographical boundaries of the home wireless communication system in a non-roaming condition, the home wireless communication system having a home system identification number stored in the memory in the mobile station, wherein the first determinator is adapted to receive a system identification number of a wireless communication system within which the mobile station has initiated the call to said one of the plurality of group phone numbers, and is further adapted to compare the received system identification number with the home system identification number stored in the memory to determine whether the mobile station is in a roaming condition.

15. The mobile station of claim **12**, wherein the processor blocks the call if:

(a) the first determinator determines that the mobile station is roaming; and

(b) the second determinator determines that the roam origination enable flag associated with said one of the plurality of group phone numbers is in its second state.

16. A mobile station for use in a wireless communication system for selectively receiving group phone calls from an originating station, said mobile station comprising:

a memory storing a plurality of group phone numbers for each group of which the mobile station is a member and a roam receive enable flag for each group phone number, said roam receive enable flags selectively settable between (a) a first state permitting calls from a particular group phone number to be received at the mobile station with the mobile station in a roaming condition, and (b) a second state prohibiting calls from the particular group phone number to be received at the mobile station with the mobile station in a roaming condition;

a transceiver adapted to receive a signal, including a group phone number, indicating that a call has been placed to the mobile station;

a first determinator adapted to determine if the mobile station is in a roaming condition;

a second determinator adapted to determine if the received signal defines a group call;

a third determinator adapted to determine the state of the roam receive enable flag associated with the received group phone number; and

an accepter adapted to accept the call responsive to the first, second and third determinators.

17. The mobile station of claim **16**, further comprising a call indicator adapted to inform a user of an accepted call.

18. The mobile station of claim **16**, wherein:

the memory further stores a home system identification number; and

the first determinator is adapted to receive a system identification number of a wireless communication system which transmits the received signal, said first determinator determining that the mobile station is in a roaming condition if the received system identification number is different from the home system identification number.

19. The mobile station of claim **16**, wherein the signal is a page message including a Caller Line Identification (CLI) field including a phone number, and the second determinator is adapted to compare a phone number in a received signal with the plurality of group phone numbers stored in said memory.

20. The mobile station of claim **16**, wherein the accepter accepts the call if:

(a) the first determinator determines that the mobile station is roaming;

(b) the second determinator determines that the received signal defines a group call; and

(c) the third determinator determines that the roam receive enable flag associated with the received group phone number is in its first state.

* * * * *

US007212802B2

(12) **United States Patent**
Rodriguez

(10) **Patent No.: US 7,212,802 B2**
(45) **Date of Patent: *May 1, 2007**

(54) **METHOD AND SYSTEM FOR PROVIDING A PORTABLE COMMUNICATION SERVICE**

(75) Inventor: **Manuel Rodriguez**, St. Petersburg, FL (US)

(73) Assignee: **Ronald R. Kelly**, Joliet, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 307 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **10/393,853**

(22) Filed: **Mar. 21, 2003**

(65) **Prior Publication Data**

US 2003/0195000 A1 Oct. 16, 2003

Related U.S. Application Data

(63) Continuation of application No. 09/302,159, filed on Apr. 29, 1999, now Pat. No. 6,577,857, which is a continuation of application No. 08/369,003, filed on Jan. 5, 1995, now Pat. No. 5,983,091.

(51) **Int. Cl.**
H04M 11/00 (2006.01)

(52) **U.S. Cl.** **455/405**

(58) **Field of Classification Search** 455/405, 455/410, 419; 379/114.1, 144, 90.01
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,640,986 A 2/1987 Yotsutani et al.
4,724,537 A 2/1988 Monet
4,776,000 A 10/1988 Parienti
4,776,003 A 10/1988 Harris
4,831,647 A 5/1989 D'Avello et al.
4,860,336 A 8/1989 D'Avello et al.
4,860,341 A 8/1989 D'Avello et al.
4,870,679 A 9/1989 Hanna
4,879,744 A 11/1989 Tasaki et al.
4,905,301 A 2/1990 Krolopp et al.
4,908,848 A 3/1990 Hanawa

(Continued)

OTHER PUBLICATIONS

Lissette Machado, Making Cellular Renting Your Business, Oct. 1993, All in Communications Magazine, p. 24.

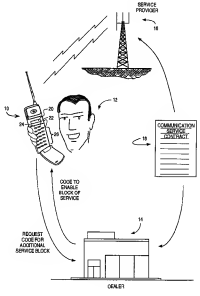
(Continued)

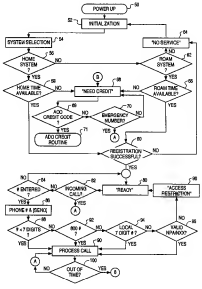
Primary Examiner—William D. Cumming
(74) *Attorney, Agent, or Firm*—Drinker Biddle & Reath LLP

(57) **ABSTRACT**

A portable communication unit that operates based upon predetermined discrete blocks of airtime. The unit may be operated as a conventional portable communication unit when airtime is available, and operation of the unit for conventional communication is disabled when all the airtime has been used. By entering a specific code, which may be supplied by a dealer, the user may activate an additional block of airtime. Two classes of airtime may be provided; home time airtime which is used when the unit is within the area of a local or primary communication service provider, and roam time airtime which is used when the unit is outside of the area of a local or primary communication service provider. The unit may be programmed, preferably only by the dealer, with toll restrictor codes that limit the available range of numbers with which the unit may initiate a communication session.

12 Claims, 7 Drawing Sheets





U.S. PATENT DOCUMENTS

4,951,308	A	8/1990	Bishop et al.
4,955,049	A	9/1990	Ghisler
5,063,591	A	11/1991	Jodoin
5,068,889	A	11/1991	Yamashita
5,068,891	A	11/1991	Marshall
5,109,401	A	4/1992	Hattori et al.
5,127,040	A	6/1992	D'Avello et al.
5,138,650	A	8/1992	Stahl et al.
5,144,649	A	9/1992	Zicker et al.
5,222,122	A	6/1993	Hamilton
5,265,155	A	11/1993	Castro
5,272,747	A	12/1993	Meads
5,274,368	A	12/1993	Breeden et al.
5,283,817	A	2/1994	Hara et al.
5,325,418	A	6/1994	McGregor et al.
5,327,482	A	7/1994	Yamamoto
5,329,589	A	7/1994	Fraser et al.
5,353,335	A	10/1994	D'Urso et al.
5,359,182	A	10/1994	Schilling
5,359,183	A	10/1994	Skodlar
5,359,642	A	10/1994	Castro
5,361,297	A	11/1994	Ortiz et al.
5,376,931	A	12/1994	Marrs
5,388,148	A	2/1995	Seiderman
5,440,621	A	8/1995	Castro
5,450,477	A	9/1995	Amarant et al.
5,625,669	A	4/1997	McGregor et al.
5,983,091	A *	11/1999	Rodriguez 455/405
6,577,857	B1 *	6/2003	Rodriguez 455/405

OTHER PUBLICATIONS

Advertisement for Next Edge, Oct. 1993, All in Communications Magazine, p. 61.

Advertisement Flyer by Omni Cellular Ltd., a 1993 publication.

Omex Communications, user's Programming Instructions, a 1993 publication.

* cited by examiner

Fig. 1

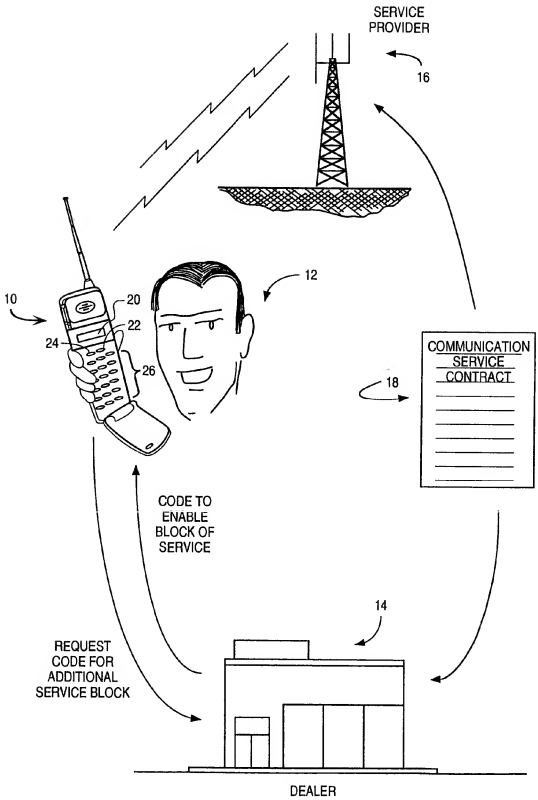

SERVICE PROVIDER
16
12
10
20
22
24
26
COMMUNICATION SERVICE CONTRACT
18
CODE TO ENABLE BLOCK OF SERVICE
14
REQUEST CODE FOR ADDITIONAL SERVICE BLOCK
DEALER

Fig. 2

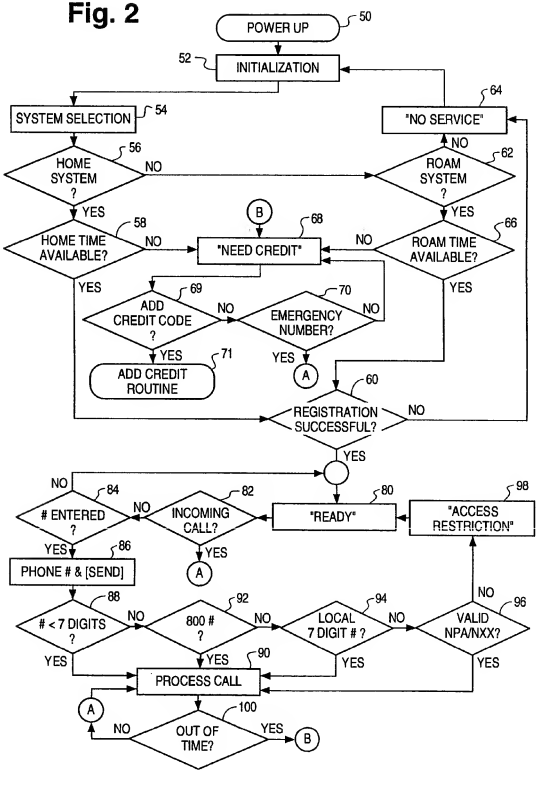

POWER UP
50
INITIALIZATION
52
SYSTEM SELECTION
54
"NO SERVICE"
64
HOME SYSTEM ?
56
NO
ROAM SYSTEM ?
62
NO
YES
YES
B
HOME TIME AVAILABLE?
58
NO
"NEED CREDIT"
68
NO
ROAM TIME AVAILABLE?
66
YES
YES
ADD CREDIT CODE ?
69
NO
EMERGENCY NUMBER?
70
NO
YES
YES
ADD CREDIT ROUTINE
71
A
60
REGISTRATION SUCCESSFUL?
NO
YES
NO
ENTERED ?
84
NO
INCOMING CALL?
82
"READY"
80
"ACCESS RESTRICTION"
98
YES
YES
PHONE # & [SEND]
86
A
88
92
94
96
< 7 DIGITS ?
NO
800 # ?
NO
LOCAL 7 DIGIT # ?
NO
VALID NPA/NXX?
NO
YES
YES
YES
YES
90
PROCESS CALL
A
100
NO
OUT OF TIME?
YES
B

Fig. 3

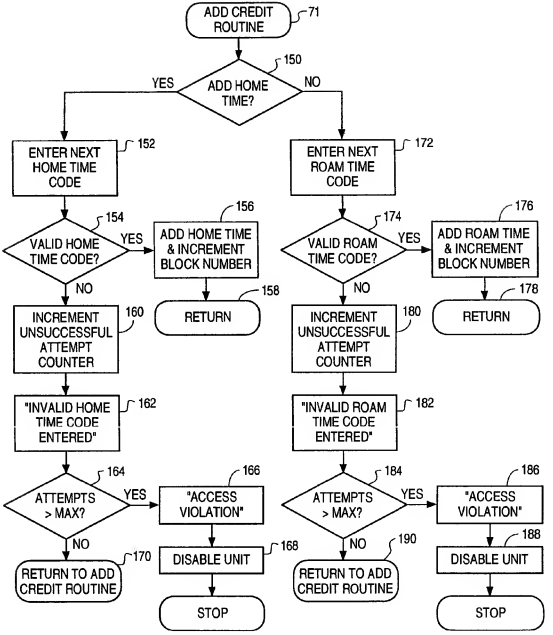
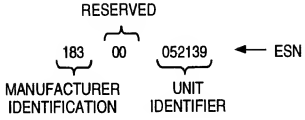
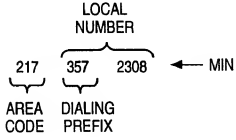
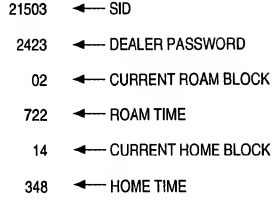

ADD CREDIT ROUTINE
71
ADD HOME TIME?
150
YES
NO
ENTER NEXT HOME TIME CODE
152
VALID HOME TIME CODE?
154
YES
ADD HOME TIME & INCREMENT BLOCK NUMBER
156
NO
RETURN
158
INCREMENT UNSUCCESSFUL ATTEMPT COUNTER
160
"INVALID HOME TIME CODE ENTERED"
162
ATTEMPTS > MAX?
164
YES
"ACCESS VIOLATION"
166
NO
DISABLE UNIT
168
RETURN TO ADD CREDIT ROUTINE
170
STOP
ENTER NEXT ROAM TIME CODE
172
VALID ROAM TIME CODE?
174
YES
ADD ROAM TIME & INCREMENT BLOCK NUMBER
176
NO
RETURN
178
INCREMENT UNSUCCESSFUL ATTEMPT COUNTER
180
"INVALID ROAM TIME CODE ENTERED"
182
ATTEMPTS > MAX?
184
YES
"ACCESS VIOLATION"
186
NO
DISABLE UNIT
188
RETURN TO ADD CREDIT ROUTINE
190
STOP

Fig. 4a


RESERVED
183
00
052139
ESN
MANUFACTURER IDENTIFICATION
UNIT IDENTIFIER


LOCAL NUMBER
217
357
2308
MIN
AREA CODE
DIALING PREFIX


21503
SID
2423
DEALER PASSWORD
02
CURRENT ROAM BLOCK
722
ROAM TIME
14
CURRENT HOME BLOCK
348
HOME TIME

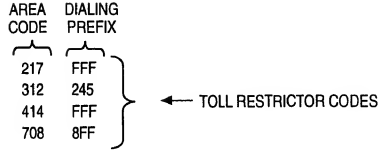

AREA CODE
DIALING PREFIX
217
FFF
312
245
414
FFF
708
8FF
TOLL RESTRICTOR CODES

Fig. 4b

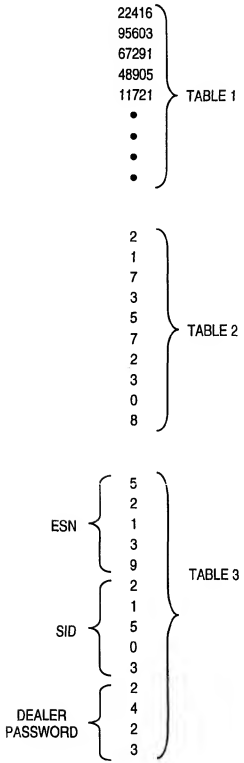

22416
95603
67291
48905
11721
TABLE 1
2
1
7
3
5
7
2
3
0
8
TABLE 2
ESN
5
2
1
3
9
SID
2
1
5
0
3
DEALER PASSWORD
2
4
2
3
TABLE 3

Fig. 5a

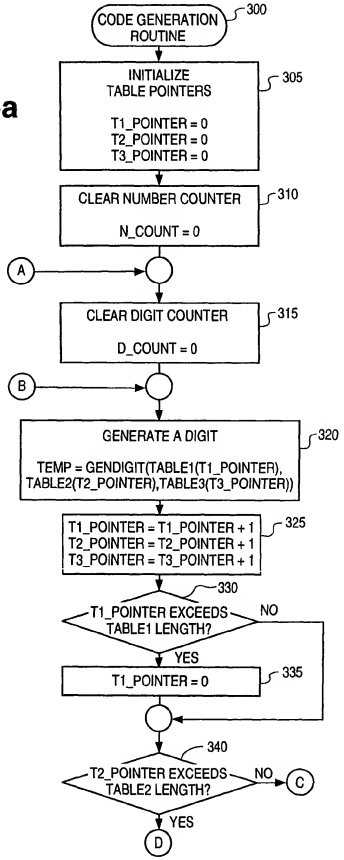
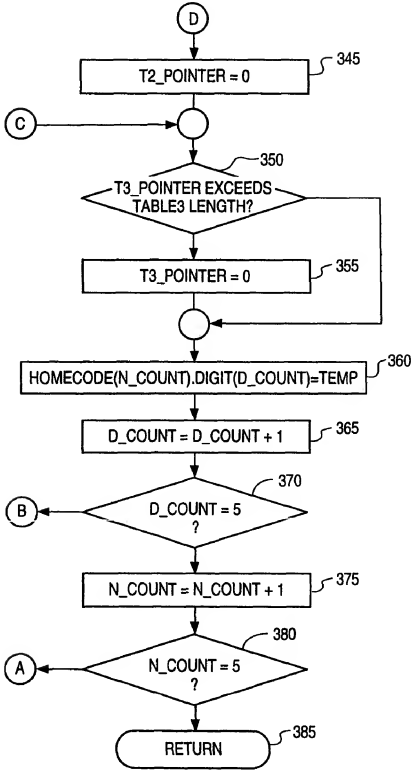

CODE GENERATION ROUTINE
300
INITIALIZE TABLE POINTERS
T1_POINTER = 0
T2_POINTER = 0
T3_POINTER = 0
305
CLEAR NUMBER COUNTER
N_COUNT = 0
310
A
CLEAR DIGIT COUNTER
D_COUNT = 0
315
B
GENERATE A DIGIT
TEMP = GENDIGIT(TABLE1(T1_POINTER), TABLE2(T2_POINTER),TABLE3(T3_POINTER))
320
T1_POINTER = T1_POINTER + 1
T2_POINTER = T2_POINTER + 1
T3_POINTER = T3_POINTER + 1
325
330
T1_POINTER EXCEEDS TABLE1 LENGTH?
NO
YES
T1_POINTER = 0
335
340
T2_POINTER EXCEEDS TABLE2 LENGTH?
NO
C
YES
D

Fig. 5b


D
T2_POINTER = 0
345
C
350
T3_POINTER EXCEEDS TABLE3 LENGTH?
T3_POINTER = 0
355
HOMECODE(N_COUNT).DIGIT(D_COUNT)=TEMP
360
D_COUNT = D_COUNT + 1
365
370
B
D_COUNT = 5 ?
N_COUNT = N_COUNT + 1
375
380
A
N_COUNT = 5 ?
RETURN
385

METHOD AND SYSTEM FOR PROVIDING A PORTABLE COMMUNICATION SERVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 09/302,159, filed Apr. 29, 1999, now U.S. Pat. No. 6,577,857, which is a continuation of U.S. patent application Ser. No. 08/369,003, filed Jan. 5, 1995, now U.S. Pat. No. 5,983,091 issued on Nov. 9, 1999, which are both herein incorporated by reference.

FIELD OF THE INVENTION

The present invention relates generally to the field of portable communication units, and more particularly to an improved portable communication unit that operates based upon discrete allocable blocks of airtime.

BACKGROUND OF THE INVENTION

With the advent of the cellular telephone communications systems, the portable communications industry has experienced tremendous growth. It is estimated that there are presently over 20 million Americans who own and operate a cellular telephone. In addition, there are several million Americans who have applied for service with a cellular telephone carrier, but have been denied service because of insufficient or a bad credit history. As a result, a significant segment of the potential market for the cellular telephone industry is excluded from receiving or even being considered for cellular telephone service.

The prior art discloses various techniques for operating a communication system base site to accept or deny a request for access from a communication unit. For example, U.S. Pat. No. 5,274,368 to Breeden et al., assigned to Motorola, Inc., discloses such a system where a communication base site processes predetermined identification codes to determine whether a particular request for access to the base site is authorized. U.S. Pat. No. 4,908,848 to Hanawa discloses another technique for operating the mobile communication system to restrict certain types of call operations. Again, the system proposed by Hanawa, like the Breeden et al. system, requires modification of the communication system base site to recognize particular unique codes associated with a request for service from a particular portable communication unit. The modifications suggested by such prior art systems, however, have not been widely nor consistently implemented.

Theft of portable communication service, particularly with respect to cellular telephone service, has been increasing at an alarming rate and now represents a major problem in the industry. In some cases, the portable communication service user is placed in an awkward position where hundreds or even thousands of dollars of unauthorized communication service has been charged to the account of the user. If the user is able to establish that such service was unauthorized, the portable communication service provider will lose the revenue for the service provided that was unauthorized. In addition to theft of service, theft of portable communication equipment has also been increasing. Portable communication equipment, which may not be recognized as stolen until significant unauthorized service has been used, is very costly to the user and the service provider.

SUMMARY OF THE INVENTION

The present invention addresses and overcomes the limitations of such prior art systems, by providing a unique portable communication unit that may be easily configured, for example by a dealer for such units, to provide portable communication service in discrete predetermined blocks of service time. A significant advance of the present invention over systems proposed by the prior art, is that the unique operational characteristics of the invention are implemented in the portable communication unit itself rather than the communication system base site. Thus, the unique features of the portable communication unit of the present invention operate independent of any communication system base site that it might communicate with. As a result, a portable communication unit in accordance with the present invention may, depending upon the configuration specified by the dealer, operate with all the functionality and versatility of a conventional portable communication unit, communicating with any number of different communication system base sites, depending upon the location of the portable communication unit.

Due to the limited amount of airtime available for the portable communication unit of the present invention at any particular time, the unit of the invention will not be desirable as a target for theft. For it is the substantial and virtually unlimited additional airtime that is the objective when a portable communication unit is stolen or used without authorization.

In addition to the foregoing advantages, the unique features of the present invention facilitate the creation of a new class of portable communication units, useful for a variety of unique and desirable service situations. For example, the portable communication unit of the present invention, which may operate for a predetermined yet limited period of time, is particularly suited to certain industries, such as for equipment repair or service personnel who are given a portable communication unit to facilitate communication during service calls. The limited amount of airtime is a feature that ensures that the unit is not used for significant periods of time when unauthorized. In addition, the portable communication unit of the present invention is also particularly well-suited for individuals with short term communications needs, such as on a rental basis, perhaps also in association with the rental of an automobile.

In accordance with one embodiment of the invention, when a user exhausts a block of airtime, the user may contact the dealer or manufacturer of the portable communication unit to obtain a code that may be entered to activate an additional block of airtime. Such codes are known to, or may be generated by the dealer, based upon several variables, some of which are unique to the particular portable communication unit. A dealer will, typically, require either a pre-payment or other assurance of payment before providing the user with a code to activate an additional block of airtime, particularly when the unit is used in the context of users who have special credit needs. When the correct code is input, an additional predetermined and discrete block of airtime is activated and may be used to operate the portable communication unit.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects of the present invention will become apparent from the following detailed description taken in conjunction with the drawings in which:

FIG. **1** is a graphical representation of a preferred environment for using the portable communication unit of the present invention;

FIG. **2** is a schematic flow diagram illustrating some of the unique operational features of the present invention;

FIG. **3** is a schematic flow diagram illustrating the Add Credit Routine utilized by the user to allocate additional airtime for the portable communication unit of the invention;

FIGS. **4**A and **4**B are block diagrams showing the contents and organization of some of the information stored in the memory of the portable communication unit of the invention; and

FIG. **5** is a schematic flow diagram illustrating the Code Generation Routine used to generate a set of unique codes which are checked against codes entered by a user to allocate additional airtime.

While the invention will be described in connection with certain preferred embodiments, it should be understood that it is not intended to limit the invention to those particular embodiments. To the contrary, it is intended to cover all alternatives, modifications and equivalents falling within the spirit and scope of the invention as defined by the appended claims. In particular, in some areas the following detailed description is cast in terms of one embodiment of the invention in the form of an improved cellular telephone handset. Such a specific description is provided only by way of example, however, and the unique and advantageous features of the invention, which are defined by the claims, are applicable to a much wider class of portable communication units that transmit and receive audio, visual and video information, as well as any of a variety of digitally encoded data, through any number of conventional communication protocols.

DETAILED DESCRIPTION OF THE INVENTION

Referring first to FIG. **1**, there is illustrated a graphical representation of one general environment for use of the unique portable communication unit **10** of the present invention. A portable communication unit user **12** may obtain a portable communication unit **10**, for example, from a commercial dealer **14** or similar vendor for portable communication equipment and services. Alternatively, the portable communication user **12** may separately purchase a portable communication unit **10** of the present invention and enter into an arrangement for service with a portable communication service dealer **14**. As will be apparent, the portable communication unit **10** of the invention is particularly well-suited for situations where the individual desiring portable communication service has an insufficient or poor credit history, effectively barring the individual from obtaining portable communication service offered by conventional means directly through any number of portable communication carriers or service providers.

According to one embodiment of the invention, the portable communication service user **12** will contact a dealer **14** that offers the sale or use of a portable communication unit **10** in accordance with the present invention. As will be described in much greater detail in the following, the portable communication unit of the invention provides portable communication service in discrete blocks of service time. Thus, upon initial purchase or rental of a portable communication unit **10** according to the invention, or upon initial activation of portable communication service, the user will be able to use the portable communication unit for a predetermined, yet limited amount of airtime. For example, the unit **10** will typically have one block of airtime available so that the user may be able to use the unit for an aggregate of 45 minutes of airtime. After the current block of service time has been used, according to one arrangement, the user **12** may contact the dealer **14** to obtain a unique authorization code to be entered into the unit **10** to enable another block of service airtime. Typically, communication with the dealer **14** to obtain a code for additional airtime will also involve the user **12** authorizing the dealer to charge the additional block of airtime to the user's account with the dealer **14**, or perhaps in some cases authorizing a charge to the credit card for the user **12**. In other cases, the dealer **14**, particularly with users that do not have an established or clean credit record, may require the user **12** to pre-pay for service time before the dealer **14** will provide the user **12** with codes for additional airtime.

According to one embodiment of the invention the portable communication unit **10** will operate based upon two different types of airtime. Home time airtime is used to operate the unit **10** when it is within the vicinity of a local service provider **16**. Roam time airtime, on the other hand, is used to operate the unit **10** when it is outside of the vicinity of a local or primary service provider **16**. Thus, the dealer **14** could be contacted by the user **12** to provide a code that could be used to activate an additional block of roam time airtime, or to provide a code that could be used to activate an additional block of home time airtime. As should be evident, in some cases certain users **12** may want to limit usage of their portable communication unit **10** for communication only within the vicinity of the local or primary service provider **16**, and will therefore only activate blocks of home time airtime to operate the portable communication unit **10**.

The portable communication unit **10** of the invention operates in a relatively conventional manner with respect to the portable communications service provider **16**, such as a service provider for cellular communications service. Thus, the unique and advantageous features of the portable communication unit **10** of the invention are essentially "transparent" to the portable communication carrier or service provider **16**. The particular portable communications carrier account or service contract **18** that provides service for the portable communication unit **10** of the invention, however, is, according to the illustrated arrangement, established and maintained by the dealer **14**, rather than the user **12**. As a result, a user **14** that otherwise might not meet the credit standards for an account with the service provider **16** may obtain portable communication service through the dealer **14** utilizing the portable communication unit **10** of the present invention that allocates airtime in discrete blocks. In some cases, of course, the service provider **16** could essentially "replace" the dealer **14** by establishing a similar relationship directly with the user **12** in conjunction with the unique portable communication unit **10** of the invention.

As can be seen in FIG. **1**, the portable communication unit **10** according to the invention resembles and is nearly identical in appearance to a conventional cellular telephone. Like a conventional cellular telephone, the portable communication unit **10** includes a set of keys **26** that may be individually pressed, for example, to dial a number or to operate the unit **10** to perform other functions. As should be evident, the portable communication unit **10** depicted in FIG. **1** is illustrated as a cellular telephone by way of example, and the unique and advantageous functional features of the present invention may be readily implemented with respect to other portable communication units, including, for example, digital personal communications systems

(PCS) which have voice, data and image communication capability. Preferably, the portable communication unit **10** will include an alphanumeric display **20** for prompting the user **12** and providing the user **12** with information regarding the status and other information regarding the unit **10**. In addition, the portable communication unit **10** will preferably also include a menu key **22** which a user **12** can press to enter a menu system or otherwise specify a particular function or routine for the unit **10** to perform. For example, the menu key **22** would likely be pressed in combination with another key or keys to display to the user the remaining amount of home time airtime available in the unit. Another key combination with the menu key **22** could display the remaining amount of roam time airtime available in the unit. Similarly, the menu key **22** could be utilized with other key combinations to perform a routine where the user could enter a code for allocating an additional block of home time or roam time airtime.

According to a preferred embodiment of the invention, the portable communication unit will also be provided with at least one "emergency" or pre-authorized number which it can communicate with at any time, even if no additional home time or roam time airtime is available. Preferably, as illustrated, this emergency number will be preprogrammed by either the manufacturer or the dealer and can be immediately activated by pressing a dedicated "hot" key **24** provided on the unit **10**. According to an alternative embodiment of the invention, such a "hot" key **24** might also allow the user **12** to use the portable communication unit **10** to contact the dealer **14** in order to request a code to allocate an additional block of airtime.

Turning now to FIG. **2**, there is illustrated in flow diagram format the general operation of the portable communication unit according to one embodiment of the invention. Operation commences in Step **50** when initial power is supplied to the portable communication unit. Next, in Step **52**, a general system initialization routine is performed where, perhaps, RAM memory for executing various portions of the routine is allocated and loaded with appropriate data and instructions from the PROM memory, and conventional diagnostic checks may be performed to ensure proper operation and configuration of the unit. In addition, certain general parameters relating to the unit itself are read from PROM memory, including, for example, the "Home" carrier station identification number in order for the unit to determine if it should operate in "Home" mode or in "Roam" mode. After initialization, the routine continues to Step **54** where, according to a conventional procedure, the portable communication unit operates to determine and select a communication carrier. Typically, this involves activating the transceiver of the unit, and "listening" for a signal from a local communication carrier system that provides identification and other information regarding the communication carrier system. Once such information is received by the unit, or the unit is unsuccessful in receiving such information from a local communication carrier, the procedure continues to Step **56**. In Step **56**, the station identification number (SID) associated with the portable communication unit is compared to the SID received from the local communication carrier system. If the two SID's are the same, the portable communication unit is in the area of its "Home" communication carrier, and the procedure continues to Step **58**.

In accordance with an important feature of the present invention, the portable communication unit operates based upon discrete and individually allocable blocks of "airtime." According to one embodiment of the invention, there is provided two different types of airtime blocks, home time blocks and roam time blocks. Generally, home time blocks will allow the portable communication unit to engage in a communication session when in its home service area, while roam time blocks will be required for the unit to engage in a communication session when the unit is outside of the home service area. The station identification number (SID) is the parameter which is utilized to determine if the portable communication unit is within its home service area, is in a service area outside of its home service area, or if the unit is in an area where no service is available.

If, in Step **56**, the comparison of the SID associated with the portable communication unit and the SID received from the communication carrier, if any, are not the same, the procedure continues to Step **62** to determine if the unit should operate in "Roam" mode, i.e., the unit is outside of its home service area. In Step **62**, the SID information associated with the communication carrier is checked to determine if it falls within a predetermined authorized range. If the SID information associated with the communication carrier falls outside of a predetermined acceptable range of values, or the portable communication unit has not received SID information from any available communication carrier from Step **54**, then the procedure continues to Step **64** to display a message indicating that the unit is presently in an area where no service is available. Otherwise, in Step **62**, if the SID information associated with a communication carrier is determined to be valid, i.e., within a predetermined acceptable range, this is an indication that the unit is in a "Roam" service area, and the procedure continues to Step **66**. If, in Step **66**, the portable communication unit determines that roam time is available from a roam time block of airtime, the procedure continues to Step **60** to complete the registration process. Otherwise, in Step **66**, if there is no roam time available from a roam time block, the procedure continues to Step **68** where a message is displayed indicating that the portable communication unit does not have any airtime left to complete the registration process and provide service to the user.

If in Step **58**, the portable communication unit determines that home time is available from a home time block of airtime, the procedure continues to Step **60** to complete the registration process. Otherwise, in Step **58**, if there is no home time available from a home time block, the procedure continues to Step **68** where a message is displayed indicating that the portable communication unit does not have any airtime left to complete the registration process and provide service to the user.

According to a preferred embodiment of the invention, the user of the portable communication unit will, even if no home time or roam time airtime is available, be able to engage in a communication session with at least one predetermined number, such as an emergency telephone number. When the procedure has reached Step **68** and the "Need Credit" message is displayed, and digits from the keypad of the unit are depressed, the procedure will continue to Step **69** to determine if the sequence of digits consists of a predetermined code for activating the routine to add additional home or roam time credit. If, in Step **69**, the particular predetermined sequence is received to activate the add credit routine, which may be comprised of, perhaps, the menu key **22** (FIG. **1**) in conjunction with another numeric key, the procedure continues to Step **71** where the Add Credit Routine is performed. Otherwise, in Step **69**, the procedure continues to Step **70** where the digits entered are analyzed to determine if they correspond to an emergency or other pre-authorized number which does not require airtime from home blocks or roam blocks to process the call. For

example, according to a preferred embodiment of the invention, the portable communication unit of the present invention will allow at least one predetermined emergency number to be processed, which may be activated, for example, by pressing a dedicated "hot" key **24** (FIG. **1**), even if no home block or roam block airtime is available. This feature of the invention ensures the user that, even though all home time and roam time airtime might be used up, the portable communication unit will still be able to provide the user with the ability to process a call to an emergency number and contact emergency personnel, since such a portable communication unit is widely recognized as an indispensable device to alert authorities in the event of an emergency situation. If such a pre-authorized emergency number is entered, the procedure jumps from Step **70** to Step **90** to a routine that processes the call. As should be evident, in addition to an emergency telephone number, the portable communication unit of the present invention may also be programmed to recognize other pre-authorized numbers, such as the telephone number corresponding to the dealer so that the user can communicate with the dealer to obtain the information required to add another home time or roam time block of airtime.

In Step **60** the portable communication unit executes a conventional registration process with the portable communication service carrier, where, for example, information is exchanged regarding the type and identification of the portable communication unit and other conventional verification routines are performed. If registration is successful, the procedure continues to Step **80** where a "Ready" message is displayed and the unit remains ready to handle an incoming call or process a request to make an outgoing call. Otherwise, in Step **60**, if registration is unsuccessful, the procedure loops back to Step **64** where a "No Service" message is displayed and the procedure continues back to the initialization step in another attempt at registration.

After the portable communication unit has been registered, if signals are received from the communication carrier indicating that an incoming call is available, the process jumps to Step **90** where the incoming call is processed in accordance with a relatively conventional portable communication call processing routine. Otherwise, if the user enters a number on the keypad, the procedure continues from Step **84** to Step **86** where information relating to the digits depressed on the keypad are received until terminated when the "Send" key is activated. Next, in Step **88**, one of a possible series of checks are performed to determine if the number entered by the user is authorized. As will be described in greater detail, an important feature of the invention is that the portable communication unit may be provided with an access restriction profile, which limits the area for which long distance and even local calls may be placed.

In Step **88**, the length of the number entered is checked; if the number is less than 7 digits, the procedure continues to Step **90**, otherwise the procedure continues to Step **92** for further checking. A number which is less than 7 digits, will be processed since it likely pertains to an emergency number or possibly one of several special "star" numbers which may be offered by the communication carrier such as, for example, *611 for connection to an operator or special service that provides traffic or directional information. If the number is not less than 7 digits, the procedure continues to Step **92** where the number is checked to determine if it is a toll-free "800" number; if it is an "800" number, the procedure continues to Step **90** to process the call, otherwise, if the number is not an "800" number, the procedure continues to Step **94** for additional checking. In Step **94** the number entered is compared to the Mobile Identification Number (MIN) unique to and associated with the portable communication unit. If the area code and the dialing prefix, i.e., the first 3 of 7 numbers of a local number, of the MIN is the same as the number entered by the user, the number entered is a local number and the routine continues to Step **90** to process the call. Otherwise, in Step **94**, if the area code and the dialing prefix of the MIN differs from that of the number entered by the user, the procedure continues to Step **96** for further checking. In Step **96**, the number entered by the user is compared to a set of authorized pairs of area codes and dialing prefixes in order to determine if the number entered by the user is authorized. If, in Step **96**, the comparison indicates that the number entered by the user is authorized, the procedure continues to Step **90** where the call is processed, otherwise the number entered is not authorized and the procedure continues to Step **98** where a message, such as "Access Restriction" is displayed indicating that the number entered by the user is not authorized.

Except for the out-of-time step indicated in Step **100**, the portable communication unit of the invention operates in Step **90** substantially as a conventional portable communication unit to process the call which has either been entered by the user or received by the carrier for connection to and communication with the portable communication unit. When a communication session has been established in Step **90**, home time or roam time airtime, whichever is appropriate, will be decremented in accordance with the connection time for the communication. For example, if the portable communication unit is powered up, the unit determines, from signals received from the communication carrier that the unit is in a "home" area, registration is successful and the user has entered a local 7 digit number, in Step **90** after the appropriate connection is made, units of time corresponding to the duration of the call are decremented from the current home time block of airtime. During the processing of the call and any communication during Step **90**, the home time or roam time airtime, whichever is appropriate, is decremented, and, in Step **100**, the current block of airtime is checked to determine if the available airtime has been completely depleted. As should be evident, after a call is terminated in Step **90**, the routine jumps back, for example, to Step **52**, or possibly Step **80**, where the portable communication unit remains "idle" until another number is entered by the user or an incoming call is received for the portable communication unit. If, however, the appropriate home time or roam time airtime is completely used up during a communication session in Step **90**, the procedure, in Step **100**, will usually branch back to Step **68**, resulting in a termination of the call and display of the "Need Credit" message.

As should be evident, however, in the event a call to an emergency number is being processed, which might have been initiated, for example, in Step **70**, an "emergency call" flag will be set. During Step **100**, the routine determines that there is no more airtime for processing the call, the "emergency call" flag should be checked to determine if the number corresponding to the call is one of the pre-approved or emergency numbers allowed to be processed when all airtime in the unit has been used up. Thus, in Step **100**, if the "emergency call" flag is set, an emergency call is presently being processed and the routine branches back to Step **90** to complete the emergency call, regardless of whether there is sufficient airtime to process the call. Otherwise, in Step **100**, if there is no airtime remaining and the "emergency call" flag is not set, a regular call is presently being processed, and

therefore the call is terminated and the routine branches back to Step **68** to display the "Need Credit" message.

Turning now to FIG. **3**, there is illustrated a flow diagram of a routine according to one embodiment of the invention for adding an additional block of either home time or roam time airtime to the portable communication unit of the present invention. This routine might be entered, for example, by the user pressing the menu key **22** (FIG. **1**) in combination with one or more predetermined numeric keys. The Add Credit Routine will typically be entered when the user enters a special keystroke sequence indicating that the user desires to access the Add Credit Routine. Alternatively, the portable communication unit of the present invention may be provided with an additional dedicated key for the user to activate in order to enter the Add Credit Routine.

The Add Credit Routine illustrated in connection with FIG. **3** relates to a routine where a single block of either home time or roam time airtime is activated when the appropriate code is entered into the portable communication unit. According to an alternative embodiment of the invention, which could be rather readily implemented by a modification to the software that operates the Add Credit Routine, more than one block of airtime could be added with a single code. In other words, the code entered could be checked by the routine to determine if it is one of several different codes, where each of the codes relates to an authorization to activate one or more blocks of airtime. Such a modification would, of course, likely result in a corresponding modification to the Code Generation Routine illustrated in FIG. **5**. Thus, by such a modified routine, a user could obtain from the dealer a code that would activate two or more blocks of either home time or roam time airtime. The routine illustrated in FIG. **3**, however, is limited to an implementation where a separate code must be entered in order to activate each additional block of airtime.

Referring to FIG. **3**, after the Add Credit Routine is entered in Step **71**, the procedure continues to Step **150** to determine if the user desires to add home time or roam time airtime. Preferably, the user will be prompted with an appropriate message in the display **20** (FIG. **1**) of the portable communication unit. If, in Step **150**, the user indicates that home time airtime is desired, the procedure continues to Step **152**, where the user is prompted to enter the next unique code to allocate another block of home time airtime. According to a preferred embodiment of the invention, the user will only be able to receive such a code by contacting the portable communication unit dealer who will authorize and pre-approve the user for another block of home time airtime. In Step **154**, the code entered by the user in Step **152** is compared to the next code generated by the portable communication unit to determine if the user has entered the correct code. As will be described in greater detail, the portable communication unit includes a routine to generate, preferably through an encryption technique, a sequence of such codes based upon a plurality of various parameters, some of which relate to information unique to the particular portable communication unit. In Step **154**, if the code entered by the user is the same as the next home time code generated by the portable communication unit, the procedure continues to Step **156** where another block of home time is allocated and the home time block counter is incremented. Next in Step **158**, the procedure returns to the point where it was called.

If, however, in Step **154**, the code entered by the user differs from the next home time code generated by the portable communication unit, the procedure branches to Step **160** where a counter relating to unsuccessful attempts to enter another airtime code is incremented. Next, in Step **162**, a message is displayed indicating that the home time code entered by the user in Step **152** was incorrect. In Step **164** the unsuccessful attempt counter is checked to determine if it exceeds a predetermined maximum number. According to this important and preferred feature of the invention, if the user enters a wrong airtime code more times than the predetermined maximum number, the portable communication unit of the invention will automatically disable and operation can only be enabled once again when the unit is returned to the dealer, or possibly the manufacturer, and reset. This important feature of the invention serves as a useful deterrent to theft or misuse of the portable communication unit, since any authorized user that attempts to repetitively and unsuccessfully "guess" and enter codes for additional airtime will be denied any further unauthorized use of the unit. On the other hand, if in Step **164** the user enters an incorrect home time code and the number of attempts is less than the predetermined maximum, the procedure, in Step **170**, loops back to the Add Credit Routine for the user to attempt to enter the correct home time code once again.

As can be seen from FIG. **3**, if, in Step **150**, the user indicates that it is desired to enter additional roam time rather than additional home time airtime, the procedure branches to Step **172** where, in Steps **174** through Steps **190**, there is provided a routine for checking and entering codes for additional roam time airtime similar to the routine set for in Steps **154** through Steps **170** with respect to adding additional home time airtime.

Turning now to FIG. **4A**, there is illustrated, by way of example, a number of parameters used by the various operating routines of the portable communication unit in accordance with the present invention. As can be seen, the unit stores a plurality of different parameters required to properly operate and identify the unit. These parameters include, a number of relatively conventional parameters, such as the Electronic Serial Number (ESN), the Mobile Identification Number (MIN), and the Station IDentification (SID) associated with the particular portable communication unit. The ESN, is similar to a conventional serial number, in that it is a number unique to each portable communication unit and is typically assigned to the unit when the unit is manufactured. A full ESN is typically, when expressed in decimal or base 10 notation, 11 digits in length. The first three digits, correspond to and identify the manufacturer of the portable communication unit, the next two digits are reserved or unused, and the remaining 6 digits are a unique identifier for the unit. According to present embodiment of the invention, 5 of the last 6 digits of a full ESN are used. With reference to the ESN illustrated in FIG. **4A**, the manufacturer identification portion of the ESN is "183", while the unit identifier is "052139", and the portion utilized by the processing routine of the present invention is the last 5 digits, or "52139."

The MIN, like the ESN, is also commonly unique to the particular portable communication unit and represents, essentially, the phone number associated with the unit. Usually, the MIN is ten numeric digits in length, and includes a three digit area code, a three digit dialing prefix and four additional digits. With reference to the MIN illustrated in FIG. **4A**, the area code, represented by the first 3 digits, is "217", the dialing prefix, represented by the next 3 digits, is "357", while the local number, which is comprised of the dialing prefix and the last 4 digits, is "3572308." The SID, typically a five digit numeric code, identifies the "home" carrier station for the portable communication unit.

The SID illustrated in FIG. **4**A is "21503." Since many portable communication units may be assigned to the same carrier station, usually based upon geographic location of the dealer or the customer with respect to the nearest portable communication carrier station, the SID is almost always a code that is not unique to the particular portable communication unit.

The portable communication unit of the present invention also includes several parameters which are not found in conventional units, including a Dealer Password, Current Roam Block, Roam Time, Current Home Block, Home Time, and a set of Toll Restrictor Codes. The Dealer Password, comprised of, perhaps, 4 numeric digits as illustrated, is a code that identifies and is unique to a particular dealer for the portable communication unit. The Current Roam Block is an index parameter that represents the current number of the roam block. Thus, each time a roam block of airtime is used up, this parameter is incremented. With reference to FIG. **4**A, the Current Roam Block is block number **2**, indicating that 1 block of roam time airtime has already been used. The Roam Time is a parameter that represents the current amount of airtime available for operating the unit in roam time mode. Illustrated by way of example in FIG. **4**A and assuming that the airtime parameter as illustrated in seconds, there is presently 722 seconds of roam time available in the current roam time block of airtime. The parameters Current Home Block and Home Time have a similar meaning in the context of home time.

It should be noted that the airtime parameter is illustrated in FIG. **4**A in units of seconds only by way of example, and the airtime parameter may be based upon different unit. Furthermore, it should be noted that according to an alternative embodiment of the invention, it is possible that, when there is no additional roam time airtime remaining, home time airtime could be utilized to operate the unit while in a roam area. In this case, the home time airtime, which typically is less expensive than the roam time airtime, would preferably be decremented at a greater rate than if the unit were operating in a home area, in order to reflect the difference in the cost between the two rates. Similarly, when there is no additional home time airtime remaining, roam time airtime could be utilized to operate the unit while in a home area. In this case, the roam time airtime, which typically is more expensive than the home time airtime, would preferably be decremented at a lesser rate than if the unit were operating in a roam area, in order to reflect the difference in the cost between the two rates.

The set of Toll Restrictor Codes represents a number of different codes that specify the allowable combination of area codes and dialing prefixes that the portable communication unit may use for operation. Illustrated by way of example in FIG. **4**A, the portable communication unit is presently programmed with a set of 4 Toll Restrictor Codes. The first Toll Restrictor Code is "217FFF", where "217" represents the allowed area code and "FFF" represents the associated allowed dialing prefix. As represented in FIG. **4**A, a Toll Restrictor Code symbol of "F" refers to a type of "wild card" digit, where any digit will be allowed. Thus, with respect to the first Toll Restrictor Code, any dialing prefix will be allowed, as long as the area code is "217." The second Toll Restrictor Code, "31224 5", does not contain any "wild card" symbols and therefore will allow only the combination of an area code of "312" and a dialing prefix of "245." The third Toll Restrictor Code is "414FFF" and is similar to the first Toll Restrictor Code in that it allows any dialing prefix, but requires an area code of "414". The fourth Toll Restrictor Code, "7088FF", indicates an area code of "708" and a dialing prefix with a first digit of "8" followed by any 2 other digits. Thus, with respect to the fourth Toll Restrictor Code, the portable communication unit would be allowed to initiate a communication session with a number "7088234221", and would be allowed to initiate a communication session with a number "7088437904", but would be restricted from initiating a communication session with a number "7087337454." As can be seen from the foregoing examples, the set of Toll Restrictor Codes may be viewed as essentially a set of "masks" where an exact digit match must be present in a position where a specific digit is specified and any digit may be present where the "wild card" symbol of "F" is specified. Preferably, the portable communication unit will have sufficient memory to accommodate many different Toll Restrictor Codes in order to provide a wide variety of allowable numeric combinations with which the portable communication unit may initiate a communication session. The Toll Restrictor Codes, of course, do not necessarily restrict the portable communication unit from establishing a communication session with a number not allowed, as long as the session is initiated by the other party.

Some of the various parameters illustrated in FIG. **4**A, will be set by the dealer when the portable communication unit is delivered to the customer. In particular, the MIN, SID, Dealer Password and Toll Restrictor Codes will typically be set by the dealer, and preferably can only be changed when the unit is given back to the dealer. The ESN, on the other hand, will typically be set by the manufacturer when the portable communication unit is manufactured. Thus, those parameters are generally not changed while the unit is in the possession of the user, and therefore remain the same until the unit is delivered back to the dealer. The other parameters, namely, the Current Roam Block, Roam Time, Current Home Block, and Home Time may be changed indirectly by the user through operation of the Add Airtime Routine or by using home time or roam time airtime through operation of the portable communication unit.

Illustrated in FIG. **4**B is an example of how the various parameters used by the portable communication unit, as well as a set of randomly selected but predetermined numbers, might be stored in different tables in the memory of the portable communication unit in order to be utilized to generate the sequence of unique codes or "keys" to be checked against the numbers entered by a user to open additional blocks of airtime. As illustrated, there are provided three different tables of various lengths. Table1 stores a unique and random sequence of numbers used, in combination with numbers from the other tables, to generate the home time and roam time codes to be checked against the codes entered by a user to add additional airtime. The unique and preferably random sequence of numbers stored in Table1 may be specific to the particular portable communication unit in which they are stored. In any event, the sequence of numbers stored in Table1 does not change while the unit is in the possession of the user. Table2 stores the various digits comprising the ten digit mobile identification number (MIN) associated with the portable communication unit, while Table3 stores the various digits associated with the four digit electronic serial number (ESN), the five digit station identifier (SID), and the four digit dealer password.

Turning now to FIG. **5**, there is illustrated, by way of example, a routine for generating a set of codes corresponding to "keys" for opening additional home time blocks of airtime, based upon information set forth in the tables Table1, Table2 and Table3 as illustrated in FIG. **4**. Although particular routine illustrated in FIG. **5** generates a set of home time codes, a set of roam time codes may be generated

with a nearly identical routine. According to the example, there is a maximum number of 36 different five-digit codes, thus a maximum of 36 blocks of airtime, for either home time or roam time airtime may be allocated. After all the blocks are allocated the portable communication unit must be returned to the dealer to be reactivated. As should be evident, however, a different code generating routine could be implemented whereby an essentially endless number of codes may be generated. The Code Generation Routine illustrated in FIG. **5**, operates by utilizing the information set forth in the tables, at least some of which is unique to the particular portable communication unit, and generates digit by digit the sequence of 36 roam time and home time codes. A digit generation routine, GenDigit generates a digit based upon three numeric parameters supplied. The GenDigit routine is preferably an encryption-type that generates a unique digit when supplied with numeric parameters.

After the Code Generation Routine is entered in Step **300**, the procedure continues to Step **305** where a set of pointers or index variables, used to sequence through the various number stored in the different tables, are initialized such that they refer or index to the beginning number in each of the tables. The variables T1_POINTER, T2_POINTER and T3_POINTER are used as indexes to the various numbers stored, respectively, in Table1, Table2 and Table3. Next, in Step **310**. the variable N_COUNT, which is used in the Code Generation Routine as a counter represetning the curfrent airtime block number, is cleared by setting it equal to 0. Similarly, in Step **315**, the variable D_COUNT, which is used in the Code Generation Routine as a counter representing the current code digit for a particular airtime block number, is cleared by setting it equal to 0. Next, in Step **320**, a unique digit is generated and assigned to the variable TEMP when the GenDigit is called and supplied with the table numbers indexed by the index variables. Thus, when the GenDigit routine is called for the first time, it will generate a number which is used as the first digit of the first code for the home time airtime block.

After a unique encrypted digit is generated from the GenDigit routine in Step **320**, the procedure continues to Step **325** where the table pointers are incremented in preparation for generation of the next digit. Next, in Step **330**, the pointer T1_POINTER is checked to determine if it exceeds the length of Table1; if it does, the procedure continues to Step **335** where T1_POINTER is reset to 0, otherwise the procedure continues to Step **340**. Similarly, in Step **340**, the pointer T2_POINTER is checked to determine if it exceeds the length of Table2; if it does, the procedure continues to Step **345** where the T2_POINTER is reset to 0, otherwise the procedure continues to Step **350**. In Steps **350** and **355** the T3_POINTER is similarly checked and reset to 0 if it exceeds the length of Table3. Next, in Step **360**, the digit generated by the GenDigit routine is assigned to the current digit of the current home time code number by setting the two-dimensional HOMECODE array, indexed by the N_COUNT and D_COUNT index variables, to the value of the variable TEMP generated by the GenDigit routine. Next, in Step **365**, the digit counter variable, D_COUNT is incremented, and in Step **370** is checked to determine if all the digits for the current home time code have been generated. If all the digits for the current home time code have not yet been generated, the procedure branches back to Step **320** where another digit is generated. Otherwise, if all the digits for the current home time code have been generated, the procedure branches to Step **375** where the code number counter, N_COUNT is incremented. In Step **380**, the value of N_COUNT is checked to determine if all the home time code numbers have been generated. If N_COUNT equals 37, all the home time code number have been generated and the routine returns in Step **385**. If, in Step **380**, not all the home time code numbers have yet been generated, the routine branches back to Step **315** where the digit counter D_COUNT is cleared in preparation for generating the first digit of the next home time code.

A similar routine to that illustrated in FIG. **5** may be used to generate codes used to activate additional blocks of roam time airtime.

As should be apparent from the foregoing description of the Code Generation Routine, the dealer, when requested by the user for an additional block of home time airtime, runs essentially an identical routine in order to provide the next authorized code to the user. Thus, all of the parameters associated with the particular portable communication unit of interest are preferably electronically stored and may be loaded and utilized in connection with the Code Generation Routine to generate the list of home time codes. The significant difference between the operation of the Code Generation Routine performed by the dealer and the routine performed by the portable communication unit is that the routine used by the dealer may be used to display, print out or otherwise output the codes, while the routine used by the portable communication unit itself, does not display or output the codes, but is limited to using the codes generated in order to verify that the user has entered the correct next code to activate the next block of airtime. By this process, the dealer may be assured that the user can only use additional airtime when authorized by the dealer, through providing the user with appropriate code to activate additional airtime.

According to an alternative arrangement, the Code Generation Routine might be run by the manufacturer of the portable communication unit, and the dealer, rather than performing the Code Generation Routine to determine the appropriate airtime codes, will be provided with a list of home time and roam time airtime codes generated by the Code Generation Routine in connection with each particular portable communication unit supplied to the dealer.

According to another alternative embodiment of the invention, an additional block of airtime for the portable communication unit might be activated without the need for any manual intervention by the user. For example, the portable communication carrier station could transmit an activation signal to the portable communication unit while the unit is in the process of registering with the station. In response to receiving such an activation signal upon registration, the unit could automatically activate an additional block of airtime. Such an activation signal would, of course, preferably only be transmitted when the dealer, or possibly the portable communication service provider, is assured that the user has adequate credit or has pre-paid for the additional block of airtime. Thus, according to such an alternative embodiment, the user would receive a portable communication unit from a dealer of portable communication equipment. Initially, the unit would be activated with an initial block of airtime, and the user would contact the dealer when the airtime is exhausted. When the dealer is satisfied that the user has sufficient credit for the additional block of airtime, the dealer will notify the portable communication carrier to transmit an activation signal when the portable communication unit attempts to register with the portable communication carrier station. Alternatively, such an activation signal could be transmitted at any time that the portable communication unit is engaged in a communication session with the portable communication carrier station.

According to yet another, although likely less desirable alternative arrangement, a portable communication unit in accordance with the invention could be configured such that an additional block of airtime could be activated manually by the dealer, such that the user would need to return to unit to the dealer when an additional block of airtime is desired. Such an embodiment might be useful in an environment where the unit is rented on a short term basis, for example, in conjunction with rented an automobile, perhaps, or other piece of equipment, where it is intended that the user will be returning the unit to the dealer within a relatively short period.

What is claimed is:

1. A method for providing a portable communication service to a user, the method comprising:

determining the user's eligibility to use the portable communication service; and

based on the user's determined eligibility, wirelessly transmitting an activation signal to a portable communication device associated with the user, the activation signal representing the amount of a first class of service time and the amount of a second class of service time available to the user to communicate over a portable communication network.

2. The method of claim **1**, wherein the determining step comprises determining whether the user has adequate credit.

3. The method of claim **1**, wherein the amount of the first class of service time and the amount of the second class of service time are based at least in part on how much money has been prepaid by the user.

4. The method of claim **1**, wherein the determining step is performed by a dealer of portable communication devices.

5. The method of claim **1**, wherein the determining step is performed by a portable communication service provider.

6. The method of claim **1**, wherein the transmitting step is performed by a portable communication carrier station.

7. The method of claim **1**, further comprising the portable communication device receiving the signal and, in response, incrementing a value in a memory of the portable communication device, wherein the value corresponds to the amount of available first class time or the amount of available second class time.

8. A method for providing a portable communication service to a user, the method comprising:

receiving, telephonically, a request from the user for an allotment of time during which the user can communicate over a portable communication network using a portable communication device;

providing, telephonically, a code to the user in response to the request;

the portable communication device receiving an entry of the code on a keypad; and in response to receiving the entry of the code, the portable communication device activating one or more functions for the allotment of time, thereby allowing the user to communicate over the portable communication network for the allotment of time using the portable communication device.

9. A wireless communication system comprising:

a portable communication provider that performs steps comprising: upon receiving verification that a user is permitted to communicate over a wireless network, transmitting a signal, via the wireless network, that is indicative of the verification; and

a portable communication device associated with the user, the device comprising a memory having stored therein data representing one or more blocks of time, wherein the device performs steps comprising: upon receiving the signal, permitting the user to gain access to those features of the device that allow the user to communicate over the wireless communication network for the one or more blocks of time; and blocking the user from using those features once the one or more blocks of time have expired.

10. The system of claim **9**, wherein the portable communication provider performs further steps comprising receiving a payment from the user.

11. The system of claim **9**, further comprising:

a portable communication device dealer that performs steps comprising preprogramming at least one of the one or more blocks of time into the portable communication device and providing the portable communication device to the user.

12. The system of claim **9**, wherein the portable communication provider performs the transmitting step while the portable communication device is registering with a portable communication station of the portable communication provider.

* * * * *

US006556819B2

(12) **United States Patent**
Irvin

(10) **Patent No.: US 6,556,819 B2**
(45) **Date of Patent: Apr. 29, 2003**

(54) **SAFE ZONES FOR PORTABLE ELECTRONIC DEVICES**

(75) Inventor: **David R. Irvin**, Raleigh, NC (US)

(73) Assignee: **Ericsson Inc.**, Research Triangle Park, NC (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/245,455**

(22) Filed: **Sep. 17, 2002**

(65) **Prior Publication Data**

US 2003/0017821 A1 Jan. 23, 2003

Related U.S. Application Data

(63) Continuation of application No. 09/398,339, filed on Sep. 17, 1999.

(51) **Int. Cl.**[7] **H04M 1/66**

(52) **U.S. Cl.** **455/410**; 455/418; 455/422; 455/456

(58) **Field of Search** 455/404, 410, 455/411, 418, 456, 422, 457, 432, 527, 421

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,442,805	A *	8/1995	Sagers et al.	455/456
5,568,153	A	10/1996	Beliveau	
5,760,690	A	6/1998	French	
5,778,304	A	7/1998	Grube et al.	
5,796,338	A	8/1998	Mardirossian	
5,802,468	A *	9/1998	Gallant et al.	455/422
5,914,675	A *	6/1999	Tognazzini et al.	340/989
5,926,756	A *	7/1999	Piesenka et al.	455/418
6,011,973	A *	1/2000	Valentine et al.	455/456
6,205,326	B1 *	3/2001	Tell et al.	455/406
6,233,448	B1 *	5/2001	Alperovich	455/414

FOREIGN PATENT DOCUMENTS

WO	WO 98/25433	6/1998
WO	WO 98/30056	7/1998

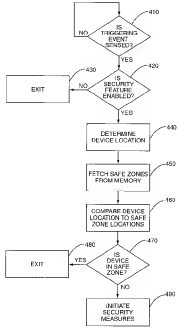
* cited by examiner

Primary Examiner—Edward F. Urban
Assistant Examiner—Ronald J. Ward
(74) *Attorney, Agent, or Firm*—Coats & Bennett, P.L.L.C.

(57) **ABSTRACT**

A security system for a cellular telephone for controlling the status of security features based on location. The invention includes at least one security feature within the cellular telephone that is activated by a triggering event. A memory unit is positioned within the cellular telephone for entering safe zone coordinates. A locator either positioned within, or accessible by, the cellular phone provides for determining the geographic location of the phone. The system compares the present location of the cellular phone with the safe zones maintained in memory. When the triggering event occurs, at least one of the security features is disabled when the cellular phone is within the safe zone coordinates. The security features are maintained enabled when the cellular telephone is outside the safe zone coordinates.

21 Claims, 4 Drawing Sheets



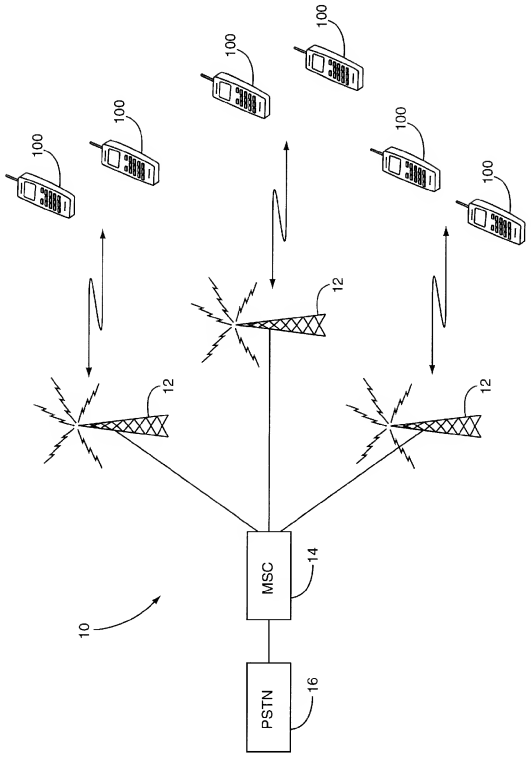


FIG. 1

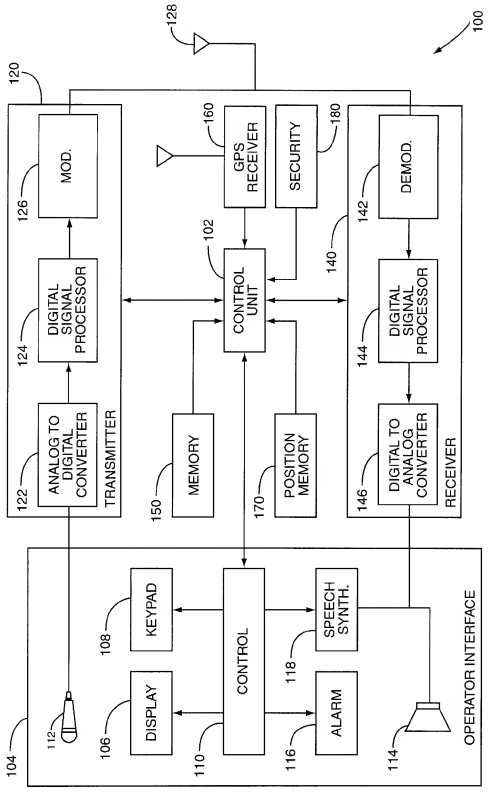

100
128
120
TRANSMITTER
122
ANALOG TO DIGITAL CONVERTER
124
DIGITAL SIGNAL PROCESSOR
126
MOD.
160
GPS RECEIVER
180
SECURITY
102
CONTROL UNIT
140
RECEIVER
142
DEMOD.
144
DIGITAL SIGNAL PROCESSOR
146
DIGITAL TO ANALOG CONVERTER
150
MEMORY
170
POSITION MEMORY
104
OPERATOR INTERFACE
112
108
KEYPAD
106
DISPLAY
110
CONTROL
118
SPEECH SYNTH.
116
ALARM
114

FIG. 2

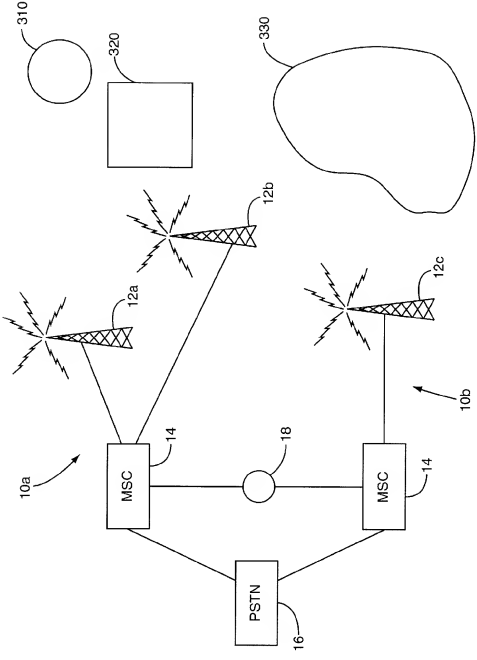


FIG. 3

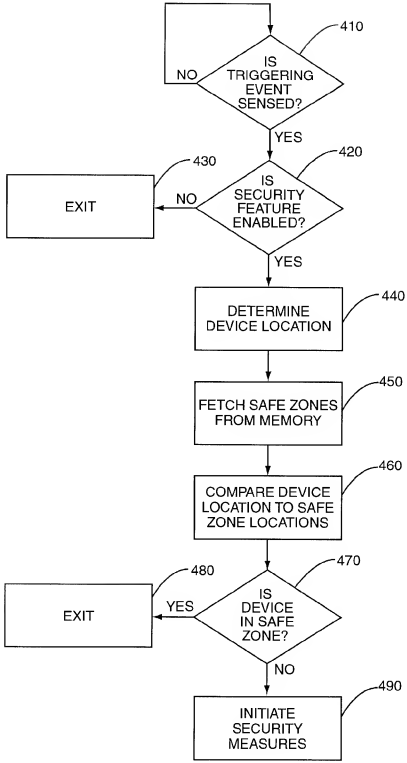

410
IS TRIGGERING EVENT SENSED?
NO
YES
420
IS SECURITY FEATURE ENABLED?
430
EXIT
NO
YES
440
DETERMINE DEVICE LOCATION
450
FETCH SAFE ZONES FROM MEMORY
460
COMPARE DEVICE LOCATION TO SAFE ZONE LOCATIONS
470
IS DEVICE IN SAFE ZONE?
480
EXIT
YES
NO
490
INITIATE SECURITY MEASURES

FIG. 4

SAFE ZONES FOR PORTABLE ELECTRONIC DEVICES

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of application Ser. No. 09/398,339, filed on Sep. 17, 1999, which is now abandoned.

BACKGROUND OF THE INVENTION

The present invention is directed to the protection of portable electronic devices and, more particularly, to allocating safe zones defined by the user in which security measures are automatically disabled for a wireless communications device.

A number of security features are available for protecting portable electronic devices against theft and accidental loss. The invention is discussed in terms of portable cellular phones, although it will be understood that it may be applied to a variety of portable devices. These security features include password protection that requires a user to input a correct password prior to using the phone, motion detectors that sound an alarm upon movement of the phone, wireless keys that inhibit the operation of the phone unless the electronic key and the phone are in close proximity, and wireless keys that signal to the user in possession of the wireless key that the phone has been left behind. Each one of these features, when properly enabled, is effective in controlling the use and custody of the phone.

Because these security features restrict the operation of the phone in some form, the features are preferably selectively enabled and disabled by the user. For example, an alarm that guards against movement would likely be disabled when the phone is being used at home, and enabled when the phone is parked for battery charging in a motel room. Because these features must be purposefully enabled and disabled, there is a risk that they will be left inadvertently disabled when needed. Often times it is not intuitive for the user to enable these features when the phone is not in use, especially when the phone is new and unfamiliar to the user. The features are also often left disabled when the user is outside their normal environment, such as travelling through airports and hotels where other concerns are often more pressing. These instances are the most likely for theft or accidental loss of the phone and the most critical times for the features to be enabled.

Additionally, there is considerable nuisance in having to enable and disable the features, as well as having to remember the phone's state at various inopportune times. The status of the safety features often cannot be determined by merely glancing at the outside of the phone. Rather, it is often required that the user pick up the phone, turn on a display screen, input a password, and then review each feature to determine whether it is enabled. Many times the user will just assume that the features are enabled without having any definite verification or knowledge.

There have been previous systems that provide for a network to program geographic areas in which the phones will be automatically disabled such as U.S. Pat. Nos. 5,442,805, and 5,778,304. By way of example, the geocoordinates of an airport or hospital may be stored in the phone and any communication into or out of these areas will be restricted. This is done to ensure that the communications do not interfere with navigation or medical equipment. These previous systems allow for a service provider or system to determine these positions but do not allow for the user to modify and personalize the locations for their own specific use.

Thus, there is a need for a system in which geographic zones can be established by the user in which safety features may be effectively disabled. This reduces or eliminates the need to continuously enable and disable the safety features each time the phone is in use or not in use.

SUMMARY OF THE INVENTION

The present invention is directed to a system for enabling and disabling security features for portable electronic devices based on the location of the device. When the phone is within specified geographic areas, such as the user's home, the security features will be disabled. When the phone is outside of the geographic areas, the security features are enabled; and, upon the occurrence of a triggering event, will be initiated to prevent against theft and accidental loss.

One embodiment of the present invention is directed to a method of providing security for a wireless communications device. The method includes defining at least one geographic safe zone and storing the corresponding geocoordinates in the wireless communications device. At least one security feature is enabled on the device. At the occurrence of a triggering event, the position of the wireless communication device is determined. When the device is outside of the geographic safe zone, the security feature is initiated for protection against theft or accidental loss. When the device is inside of the safe zone, the occurrence of the triggering event will not initiate the security feature.

In another embodiment of the invention, the phone includes a memory to allow for the user to input specific geographic safe zone areas that they frequently occupy, such as their home or office. The phone will be used in these areas under normal conditions, and is understood to be secure. The phone preferably includes a global positioning system that provides for determining the geographic location of the phone and security features such as password protection, motion detector, wireless keys, etc. When the security features are enabled and a triggering event occurs, the invention provides for the current position of the phone is compared with the safe zones. If the phone is in one of the safe zones, the security features will not be initiated. If the phone is outside of any safe zone, the security feature will be initiated.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram of a communication system;

FIG. **2** is a block diagram of a mobile communication terminal that receives the targeted message;

FIG. **3** is a schematic diagram illustrating the positioning of safe zones within communication systems; and

FIG. **4** is a flowchart illustrating the logic of disabling and enabling the security features within the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings, a system and method for automatically activating and deactivating security features of a cellular phone based on location will be described. The disclosed embodiment is used in a mobile communications system, and specifically within a cellular phone. However, the invention may be used in other types of portable electronic devices such as personal computers, paging devices, etc.

The mobile communications system, which is indicated generally by the numeral **10** in FIG. **1**, typically includes a

plurality of base stations **12** which are connected via a mobile switching center (MSC) **14** to a terrestrial communications network such as the Public Switched Telephone Network (PSTN) **16**. Each base station **12** is located in and provides service to a geographic region referred to as a cell. In general, there is one base station **12** for each cell within a given system. Within each cell, there may be a plurality of mobile communication terminals **100** that communicate via radio link with the base station **12**. The base station **12** allows the user of the mobile communication terminal **100** to communicate with other mobile communication terminals **100**, or with users connected to the PSTN **16**. The MSC **14** routes calls to and from the mobile communication terminal **100** through the appropriate base station **12**. Information concerning the location and activity status of the mobile communication terminal **100** is stored in a database at a locator **18** which is connected to the MSC **14** so that the system can route communications to the base station that is currently servicing the mobile communication terminal **100**. In this illustration, the communications system **10** is a digital cellular telephone system such as a system that operates according to ANSI-41/ANSI-136.

FIG. **2** is a block diagram illustrating one embodiment of the mobile communication terminal **100**. The mobile communication terminal **100** shown in FIG. **2** is a fully functional radio transceiver capable of transmitting and receiving digital signals. Those skilled in the art will recognize, however, that the present invention may be implemented in an analog transceiver, as well as in a wide variety of other portable electronic devices. The mobile communication terminal **100** includes a control unit or logic unit **102**, an operator interface **104**, a transmitter **120**, a receiver **140**, a memory **150**, a positioning receiver **160**, a position memory **170**, and security unit **180**.

The operator interface **104** includes a display **106**, keypad **108**, control unit **110**, microphone **112**, speaker **114**, alarm **116**, and speech synthesizer **118**. The display **106** allows the user to see dialed digits, call status information, and security feature status. The keypad **108** allows the user to dial numbers, enter commands, and select options. The control unit **110** interfaces the display **106** and keypad **108** with the control unit **102**. The microphone **112** receives audio signals from the user and converts the audio signals to analog signals. Speaker **114** converts analog signals from the receiver **140** to audio signals that can be heard by the user. The alarm **116** produces an audible tone to notify the user in case of receipt of an urgent message or activation of a security feature. The speech synthesizer **118** converts text messages to an audible signal that can be played back through the speaker **114**.

The analog signals from the microphone **112** are applied to the transmitter **120**. The transmitter **120** includes an analog-to-digital converter **122**, a digital signal processor **124**, and a modulator **126**. The analog to digital converter **122** changes the analog signals from the microphone **112** into a digital signal. The digital signal is passed to the digital signal processor **124**. The digital signal processor **124** compresses the digital signal and inserts error detection, error correction and signaling information. The compressed and encoded signal from the digital signal processor **124** is passed to the modulator **126**. The modulator **126** converts the signal to a form that is suitable for transmission on a RF carrier.

The receiver **140** includes a demodulator **142**, a digital signal processor **144**, and a digital to analog converter **146**. Received signals are passed to the demodulator **142** which extracts the transmitted bit sequence from the received signal. The demodulator **142** passes the demodulated signal to the digital signal processor **144** which decodes the signal, corrects channel-induced distortion, and performs error detection and correction. The digital signal processor **144** also separates control and signaling data from speech data. The control and signaling data is passed to the control unit **102**. Speech data is processed by a speech decoder and passed to the digital-to-analog converter **146**. The digital-to-analog converter **146** converts the speech data into an analog signal which is applied to the speaker **114** to generate audible signals which can be heard by the user.

The control unit **102**, such as a programmed microprocessor, functions to coordinate the operation of the transmitter **120** and the receiver **140**. Memory **150** stores the program instructions and data needed by the control unit **102** to control the communications terminal **100**. The functions performed by the control unit **102** include power control, channel selection, timing, as well as a host of other functions. The control unit **102** inserts signaling messages into the transmitted signals and extracts signaling messages from the received signals. The control unit **102** responds to any base station commands contained in the signaling messages, and implements those commands. When the user enters commands via the keypad **108**, the commands are transferred to the control unit **102** for action. Because the details of the general construction and operation of the mobile communication terminal **100**, are well-known in the art, they will not be further discussed herein except as appropriate to place the invention in context.

The positioning receiver **160** receives signals from a space-based or land-based station that transmits positioning data. For example, the positioning receiver **160** could be a GPS receiver. The received data is passed to the control unit **102** which uses the information to calculate the geographic location of the communication terminal **100**. The location is then stored in the position memory **170**. The position memory **170** can be an operational register within the control unit **102** or an address space in memory **150**. The position memory **170** could also be a separate RAM memory.

Many phones do not contain a GPS receiver and must rely on other means for determining the geographic position. One method provides for the system to monitor the location and relay the information to the phone. As illustrated in FIG. **3**, a locator **18** is associated with each system **10** for monitoring the location of the phone **100**. As the phone moves through the cells of a system, and between other systems, the position of the phone is tracked and stored at the locator **18**. One method-provides for location positioning during a control function such as a phone power-on, transition to a new system, call origination, security feature trigger, phone power-off, etc. Additionally, the system may provide for timer-based or autonomous positioning in which location positioning occurs at periodic intervals while the phone is turned on. The intervals may range between about every few seconds to about once every hour depending upon the parameters of the system. The location information is communicated through the MSC **14** and base stations **12** to the phone's control unit **102**. The current position may be saved in the position memory **170** with the previous phone locations, or the memory may only contain the new location.

In another embodiment, the phone location may be maintained only at the locator **18** and not locally within the phone. When the phone location is required, the most recent position maintained within the locator **18** is communicated to the control unit **102** for processing.

Security unit **180** provides features for preventing the theft and inadvertent loss of the phone. Security features

available within the phone include motion detectors, password protection, wireless key mode, and others. The motion detectors sense movement of the phone and may communicate with the alarm **116** through the control unit **102** and control **110** to provide an audible alarm upon movement of the phone. Password protection requires the user to input a correct password prior to the control unit **102** activating the phone. When an incorrect password is entered through the keypad **108**, the control unit **102** may provide for an additional chance to input the correct password, or may simply turn the phone off preventing a thief or other non-authorized user from transmitting or receiving communications. A wireless key mode requires that a key be within a predetermined proximity to the phone for the control unit **102** to allow the phone to function. It is understood that additional security features may also be included within the present invention. Additionally, a single phone may have numerous security features.

Each enabled security feature will be initiated upon the occurrence of a triggering event. The triggering event may be different for each security feature, such as movement of the phone triggers the motion detector, incorrect password entry triggers the password protection, etc. Preferably, each of the security features may be individually enabled or disabled by the user. By way of example, if the phone is equipped with password protection but the user does not wish to use it, he/she may disable the feature and it will not be initiated during a triggering event. The user may change the status of each security feature through the keypad **108**. Preferably, the status of each security feature is shown on the display **106**.

Safe zones are geographic areas in which safety features that have been enabled by the user are automatically disabled and will not be initiated upon the occurrence of a triggering event. Because the user commonly frequents these areas, phone usage within the safe zones is understood to be approved usage. As illustrated in FIG. **3**, the user may allocate a number of separate safe zones for the phone. In one preferred embodiment, the safe zone may be sized to encompass the dimensions of a house or office building as illustrated by **310**. Alternatively, the dimensions of the safe zone may be larger to encompass a square block of a business district **320**, or an entire city or state **330**. The safe zones may be within a single cell covered by one base station **12**, may be positioned in several different cells covered by more than one base station **12**, or may be positioned about more than one system. By way of example as illustrated in FIG. **3**, safe zone **310** is covered by single base station **12***a*, safe zone **320** is covered by two base stations **12***a* and **12***b*, and safe zone **330** is covered by two base stations **12***b*, **12***c*, positioned within two separate systems **10***a*, **10***b*. The resolution of the location detection may be such that the exact position of the phone cannot be precisely determined, especially when the phone is located on in the area around the edge or "fringe" of the safe zones. In such a case, the parameters of the system may be established for either considering the phone within or outside of the safe zone when positioned at these "fringe" geographic locations.

The shape and size of the safe zones are defined by the user. In one method, the user inputs the geocoordinates of a center position specifying the latiude and longiude of the center of a circular geographic region, and a radius which specifies the radius of the circular geographic area. Likewise, the safe zone can be defined for other shapes or by specifying the size and using a default center, or by specifying the longitude and latitude of the boundaries of a region, and the like.

There are several different manners of inputting the safe zones into the phone. In a preferred embodiment, the user geographically positions the phone within the middle of the safe zone and determines the geocoordinates from the GPS receiver **160** or the locator **18**. Menu options and keypad interaction enables the user to store these into the position memory **170**. Additionally, menu options provide for determining the shape and size of the safe zone which are then also stored in the position memory **170**. Alternatively, the safe zone geocoordinates can be independently determined by the user and loaded manually into the position memory **170** through the keypad **108**. This method provides for the user to input safe zone coordinates when the phone is not physically located at the safe zone position.

FIG. **4** illustrates the logic of the present invention in determining whether to activate the enabled security features. In preparation, safe zones are input into the position memory **170** for those areas that the user frequents. Once enabled, the system waits until an outside triggering event such as motion detection, or powering-on the phone which begins the process (block **410**). Once it is determined that the triggering event has occurred, the control unit **102** determines whether security features have been enabled (block **420**). If none of the security features have been enabled, the process exits (block **430**). When at least one security feature has been enabled, the control unit **102** must then determine the location of the phone (block **440**). One method provides for the GPS receiver **160** to determine the phone location at the time of the triggering event. Alternative methods provide for the control unit to use the last known phone location stored within the position memory **170**, or the control unit fetches the current positioning information from the locator **18**. Once the phone location is determined, the control unit fetches the safe zones from the position memory **170** (block **450**) and compares the phone location with the locations of the safe zones stored in the position memory **170** (block **460**). If the phone is within a safe zone, the control unit **102** understands the phone to be safe and the process is terminated (block **480**). If the phone is not within a safe zone, security measures are initiated such as providing an audio alarm, or activating a secondary security system such as requiring a password (block **490**).

More than one security feature may be enabled at a given time. Additionally, different security features may be activated at different areas. By way of example as viewed in FIG. **3**, the phone may be equipped with both password protection and a motion detector. Within the user's sales region **330**, the user may desire to only disable the password protection but still require that the motion sensor remain enabled because the user is worried of someone stealing the phone while being charged at night in a hotel room. At safe zone **320** which may be the user's office, the motion detector may be disabled because the phone is in the user's pocket all day during work, but the password protection remains enabled because the user does not want someone to inadvertently use the phone. Safe zone **310**, representing the user's home, may disable both security features.

Alternatively, the user may provide that all use of the phone outside of a safe zone be prohibited. By way of example, if the user only uses the phone within their home **310**. Only usage within the safe zone will be allowed as the security features will remain enabled at all times and will be initiated upon a triggering event.

In the foregoing description, like reference characters designate like or corresponding parts throughout the Figures. Also in the foregoing description, terms such as "forward", "backward", "left", "right", "upwardly",

"downwardly", and the like are words of convenience and are not to be construed as limiting terms. Certain modifications and improvements will occur to those skilled in the art upon a reading of the foregoing description. It should be understood that all such modifications and improvements have been deleted herein for the sake of conciseness and readability but are properly within the scope of the following claims.

What is claimed is:

1. A method of providing security for a portable electronic device comprising:

a. defining at least one geographic safe zone and storing corresponding geocoordinates in the portable electronic device;

b. selectively enabling at least one security feature on the portable electronic device;

c. acquiring the position of the portable electronic device;

d. sensing the occurrence of a triggering event; and

e. in response to the sensing of the triggering event, initiating the at least one security feature conditioned on whether the location of the portable electronic device is outside of the at least one geographic safe zone.

2. The method of claim **1**, further including storing a plurality of safe zones within the portable electronic device, each of the safe zones being selectively shaped and sized.

3. The method of claim **1**, wherein determining the position of the portable electronic device is performed by a GPS receiver contained within the device.

4. The method of claim **1**, wherein determining the geographic position of the device is accomplished through a wireless communications system that determines the location of the portable electronic device and forwards the location to the device.

5. The method of claim **1**, wherein the position of the portable electronic device is determined at periodic time intervals.

6. The method of claim **1**, wherein the position of the portable electronic device is determined at the occurrence of a control function.

7. The method of claim **1**, wherein the position of the portable electronic device is determined after the occurrence of the triggering event.

8. The method of claim **1**, wherein the position of the portable electronic device is determined prior to the occurrence of the triggering event.

9. The method of claim **8**, wherein the position is maintained at a locator and the is portable electronic device fetches the location upon the occurrence of the triggering event.

10. The method of claim **1**, wherein the portable electronic device is a wireless communications device.

11. The method of claim **10**, wherein the wireless communications device is a cellular phone.

12. A method of providing security features of a wireless communications device, the device having a memory unit and at least one security feature that is activated by a triggering event, the method comprising the steps of:

a. defining at least one safe zone having a geographic area and storing the at least one safe zone within the memory unit,

b. selecting which of the at least one security feature will be disabled within each safe zone and storing the selection in the memory unit;

c. thereafter, sensing the occurrence of the triggering event;

d. determining whether the wireless communications device is geographically located within any of the safe zones; and

e. over-riding the security features that are listed within the memory unit for the corresponding safe zone.

13. The method of claim **12**, further including disabling at least one security feature within each safe zone.

14. The method of claim **12**, further including defining the safe zones by positioning the wireless communication device at a desired safe zone geographic position and entering corresponding geocoordinates into the memory unit.

15. The method of claim **14**, further including entering the size and shape of each safe zone into the memory unit.

16. The method of claim **12**, wherein defining the at least one safe zone is performed by entering geocoordinates into the memory unit obtained from an independent location device.

17. The method of claim **12** wherein determining the location of the wireless communications device is performed at periodic time intervals and stored within the memory unit.

18. The system of claim **12**, further including disabling the corresponding security features when the wireless communications device is positioned within a fringe location of a safe zone.

19. The system of claim **12**, further including defining safe zones that are geographically positioned within more than one wireless communications system.

20. A method of preventing theft and accidental loss of a wireless communications device comprising:

a. defining a safe zone of a geographic area and storing the safe zone within a memory of the device;

b. enabling a security feature of the device;

C. sensing the occurrence of a triggering event;

d. determining the current position of the device through a locator positioned within the device upon sensing the occurrence of the triggering event;

e. comparing the current position of the device with the safe zone; and

f. initiating the security feature if the device is positioned outside of the safe zone.

21. A wireless communications device having at least one security feature, said device comprising:

a. means for defining at least one geographic safe zone and inputting it into a memory unit within the wireless communications device; and

b. means for determining a geographic location of the cellular telephone;

c. at least one of said security features being disabled when said wireless communications device is positioned within at least one of said safe zones and being enabled when said wireless communications device is positioned outside said safe zones.

* * * * *

US006799052B2

(12) **United States Patent**
Agness et al.

(10) **Patent No.: US 6,799,052 B2**
(45) **Date of Patent: Sep. 28, 2004**

(54) **HAND-HELD CELLULAR TELEPHONE SYSTEM WITH LOCATION TRANSMISSION INHIBIT**

(76) Inventors: **Michael K. Agness**, 14 Pine St., Kearny, NJ (US) 07032; **John M. Allegrezza**, 15-3 Potters Pl., Holland, PA (US) 18966; **John J. Simkanich**, 122 Chesapeake Dr., Newtown, PA (US) 18940

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 533 days.

(21) Appl. No.: **09/779,386**

(22) Filed: **Feb. 8, 2001**

(65) **Prior Publication Data**

US 2002/0107032 A1 Aug. 8, 2002

(51) **Int. Cl.**[7] **H04Q 7/20**

(52) **U.S. Cl.** **455/456.4**; 455/456.1; 455/456.5; 455/565; 455/569.1; 455/414.1

(58) **Field of Search** 455/414.1, 456.1–456.6, 455/457, 432, 433, 418, 419, 420, 521, 404.1, 404.2, 565, 569, 569.1

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,442,805 A * 8/1995 Sagers et al. 455/456.1
5,940,764 A * 8/1999 Mikami 455/456.1
6,011,973 A * 1/2000 Valentine et al. 455/456.1
6,038,445 A * 3/2000 Alperovich et al. 455/422
6,108,563 A * 8/2000 Shishino 455/560
6,201,973 B1 * 3/2001 Kowaguchi 455/456.1
6,389,288 B1 * 5/2002 Kuwahara et al. 455/456.1
6,421,544 B1 * 7/2002 Sawada 455/565

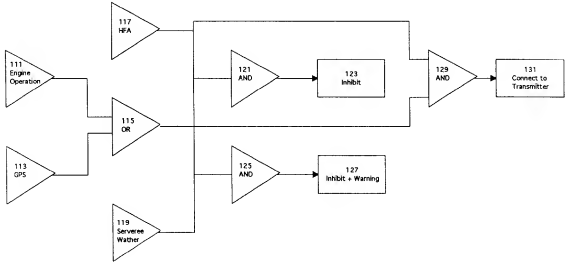
* cited by examiner

Primary Examiner—Duc M. Nguyen

(57) **ABSTRACT**

A digital cellular telephone circuit contains a GPS (Global Positioning System) location circuit, which generates a location code indication signal transmitted to a cellular signal processing station communication server at a local cell base station, when a transmission (telephone call) is placed or received by a cellular user. A program on the server interrogates appropriate ones of various stored databases which contain location information for cell transmission inhibit. Monitoring and control software in the communications server compares the cellular telephone's GPS location against the stored databases of transmission inhibit locations. Such inhibit locations may include GPS highways locations, restricted commerce GPS locations, restricted activity selection, and others. If location or activity transmission inhibit data is found, the control software looks for the presence of an override signal bit. A rejection tone or message may be sent when calls are rejected. If the cellular telephone has been connected in an override state as a result of a special predetermined condition, i.e., a hands-free communication, or a "911" emergency call or medical alert is being placed, the cellular unit transmits an indicator signal which causes a by-pass of the inhibit function.

8 Claims, 7 Drawing Sheets



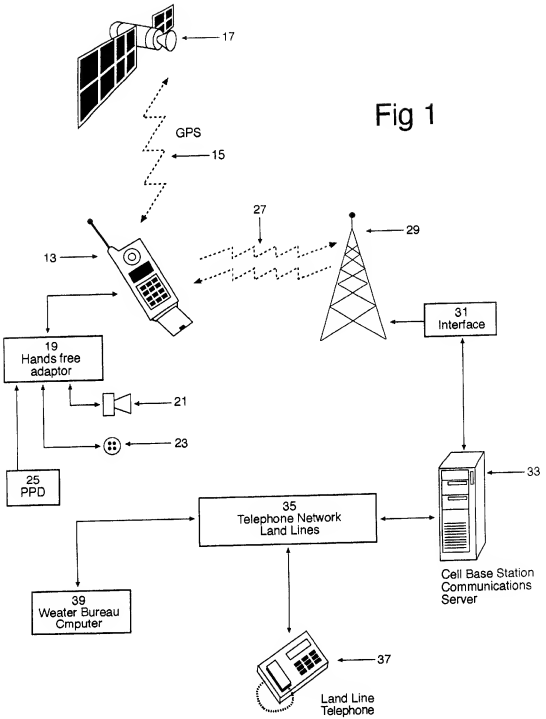

17
GPS
15
27
29
13
31
Interface
19
Hands free
adaptor
21
23
25
PPD
33
35
Telephone Network
Land Lines
Cell Base Station
Communications
Server
39
Weater Bureau
Cmputer
37
Land Line
Telephone

Fig 1

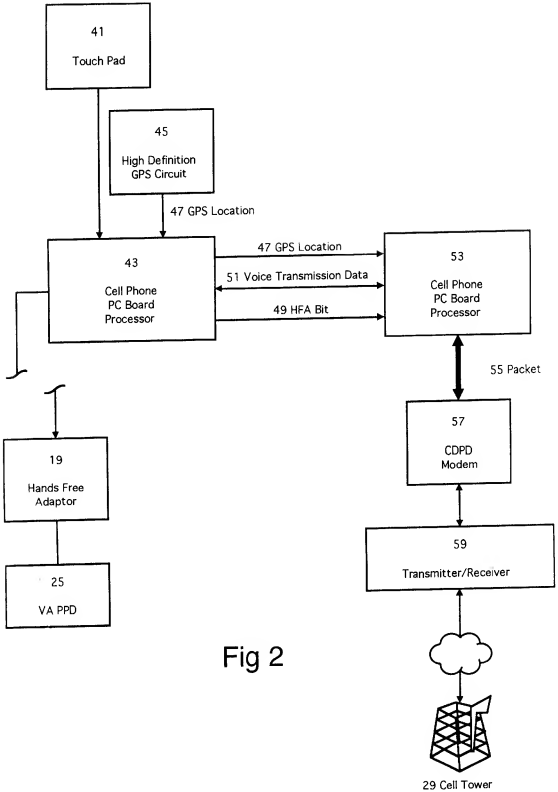

41
Touch Pad
45
High Definition GPS Circuit
47 GPS Location
43
Cell Phone PC Board Processor
47 GPS Location
51 Voice Transmission Data
49 HFA Bit
53
Cell Phone PC Board Processor
55 Packet
57
CDPD Modem
59
Transmitter/Receiver
19
Hands Free Adaptor
25
VA PPD
29 Cell Tower

Fig 2

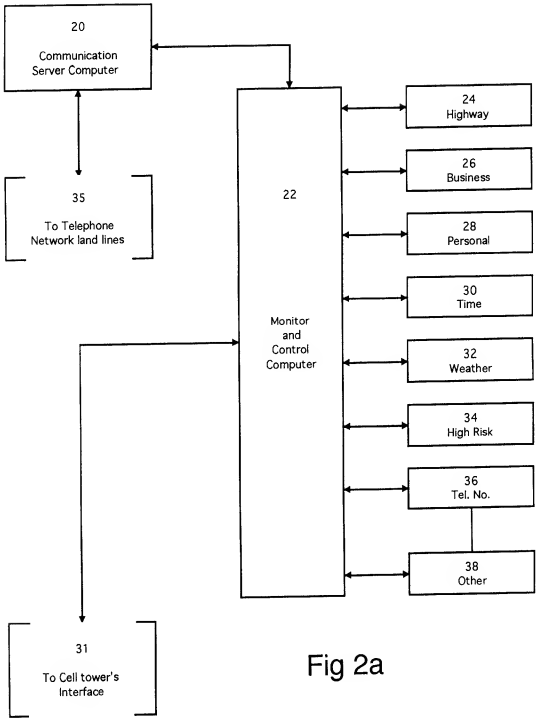

20
Communication Server Computer
35
To Telephone Network land lines
22
Monitor and Control Computer
24
Highway
26
Business
28
Personal
30
Time
32
Weather
34
High Risk
36
Tel. No.
38
Other
31
To Cell tower's Interface

Fig 2a

Fig 3

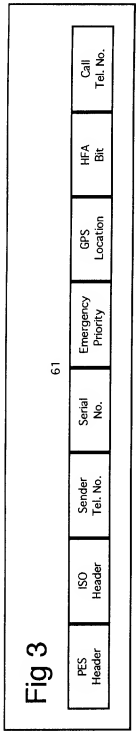

61
PES Header
ISO Header
Sender Tel. No.
Serial No.
Emergency Priority
GPS Location
HFA Bit
Call Tel. No.

Fig 5

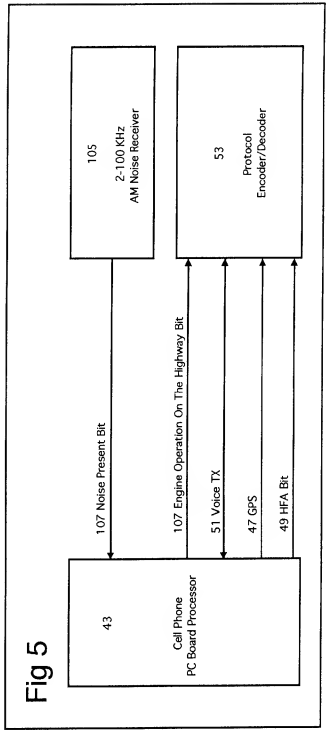

43
Cell Phone PC Board Processor
107 Noise Present Bit
107 Engine Operation On The Highway Bit
51 Voice TX
47 GPS
49 HFA Bit
105
2-100 KHz AM Noise Receiver
53
Protocol Encoder/Decoder

Fig 4

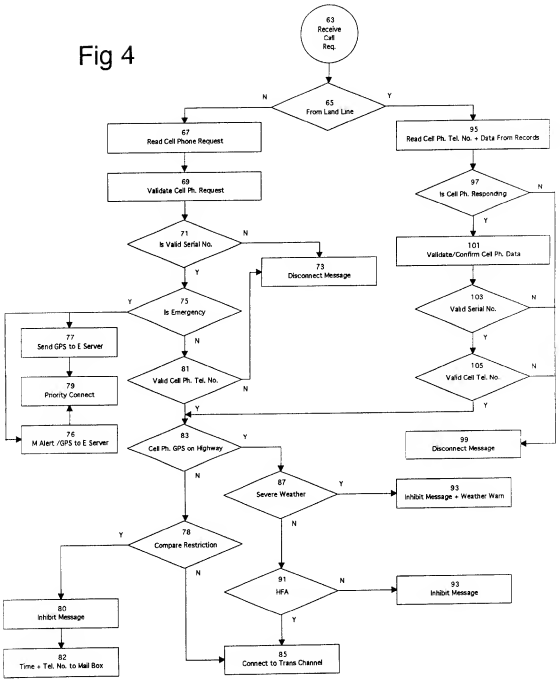

63
Receive Call Req.
65
From Land Line
N
Y
67
Read Cell Phone Request
69
Validate Cell Ph. Request
71
Is Valid Serial No.
N
Y
73
Disconnect Message
75
Is Emergency
Y
N
77
Send GPS to E Server
79
Priority Connect
81
Valid Cell Ph. Tel. No.
N
Y
76
M Alert /GPS to E Server
83
Cell Ph. GPS on Highway
Y
N
78
Compare Restriction
Y
N
80
Inhibit Message
82
Time + Tel. No. to Mail Box
85
Connect to Trans Channel
87
Severe Weather
Y
N
91
HFA
N
Y
93
Inhibit Message + Weather Warn
93
Inhibit Message
95
Read Cell Ph. Tel. No. + Data From Records
97
Is Cell Ph. Responding
N
Y
101
Validate/Confirm Cell Ph. Data
103
Valid Serial No.
N
Y
105
Valid Cell Tel. No.
N
Y
99
Disconnect Message

Fig 6

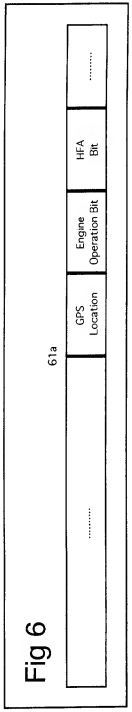

61a
.....
GPS Location
Engine Operation Bit
HFA Bit
.....

Fig 8

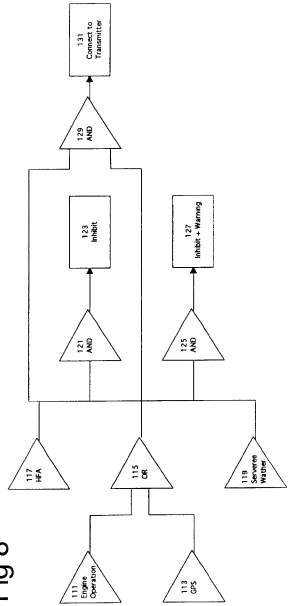
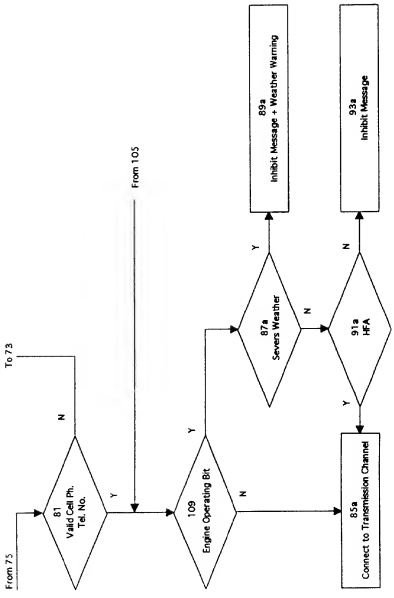

111 Engine Operation
113 GPS
115 OR
117 HFA
119 Severe Weather
121 AND
123 Inhibit
125 AND
127 Inhibit + Warning
129 AND
131 Connect to Transmitter

Fig 7


From 75
81
Valid Cell Ph. Tel. No.
N
To 73
Y
From 105
109
Engine Operating Bit
Y
N
87a
Severe Weather
Y
89a
Inhibit Message + Weather Warning
N
91a
HFA
N
93a
Inhibit Message
Y
85a
Connect to Transmission Channel

HAND-HELD CELLULAR TELEPHONE SYSTEM WITH LOCATION TRANSMISSION INHIBIT

BACKGROUND OF THE INVENTION

The present invention is directed to an improvement to an existing cellular telephone system, which improvement has a monitoring and control circuit which inhibits the transmission of cell phone communications when the cell phone user is on a highway, in a restricted location such as a hospital treatment room, a court room and the like, or in a user pre-registered location.

The invention is further directed to a monitoring and control circuit which detects permissible highway cell phone use under hands-free operation, but which may also inhibit cell phone use under severe driving conditions even with hands-free operation.

Modern cellular telephones (cell phones) are so small and portable that users can carry them in their pockets and use them anywhere, even while operating a motor vehicle.

Studies by the National Highway Traffic Safety Administration (NHTSA) of the United States Department of Transportation have shown that automotive driver attention is distracted when holding and using a cell phone. It is estimated that as many as 40 percent of the drivers presently use cell phones while driving. The Network of Employers for Traffic Safety reported to the NHTSA estimates of between 4000 and 8000 traffic accidents per day caused by distracted drivers. The *New England Journal of Medicine* has reported a study which found that cell phone use while driving quadrupled the risk of an accident and was almost as dangerous as being drunk behind the wheel.

Municipalities are beginning to enact anti-cell phone driving ordinances. Several states are considering passing anti-cell phone driving motor vehicle laws. Certain civil rights activists are pressing for individual freedoms to continue motor vehicle cell phone use. It is anticipated that many years may pass before the issues involved with anti-cell phone motor vehicle laws are settled. Even with laws in place, the ability of police enforcement will always be a concern.

Modern digital cellular telephones (cell phones) can contain Global Positioning System (GPS) circuitry imbedded on the basic circuit board. This GPS circuitry determines the latitude and longitude location of the cell phone circuitry, from navigation system signals received from a satellite system developed as part of the United States Department of Defense NAVSTAR program. This GPS location information which can be available to digital cell phone transmission circuitry has in the past, because of government restrictions on the NAVSTAR satellite system, had a locating accuracy in excess of 20 feet.

Various databases for roadway locations are available from such sources as Rand McNally Company, Microsoft Inc., and others. These databases contain the location description of each roadway in the United States by latitude and longitude.

The U.S. Weather Service and regional weather centers make severe weather information available to the public according to GPS locations.

Additionally, restricted wireless commerce locations exist where cellular phone operation is prohibited. These include transportation equipment with highly sensitive equipment, i.e. air planes and super-speed trains, court rooms, religious services, hospital treatment rooms, prison cells and penitentiary grounds, high risk manufacturing locations, and the like. A cell user may also select to have his calls inhibited on a time delegated basis, such as from 12 midnight to 6 am.

Further, each cell phone can be programmed to place a predetermined medical alert call, such as those placed by present personally worn medical alert systems. This medical alert transmission would include a coded "help" message and the GPS location of the cell phone user.

It is desirable, therefore, to address cellular phone use from a scientific approach. This includes for each intended cellular transmission the determination of restricted activity or restricted location on a time and/or GPS location basis. With proper cell phone blocker equipment, automobile insurance companies and other industries would be free to grant vehicle insurance premium reductions, workman compensation insurance reductions, just as they now do with auto alarm systems, auto air bags, building fire and theft detection systems and other such safety systems.

It is secondly desirable to utilize digital cell phone GPS information, roadway GPS information and weather information to inhibit the ability to make cell phone calls while on a roadway in severe weather.

It is also desirable to inhibit telephone transmission at the local communications server with cell phones being used on the roadway in the absence of a hands-free operation, and at other predetermined restricted locations or at predetermined restricted times.

It is further desirable to incorporate monitoring and control circuitry into each cell tower communications server to compare cell phone GPS location with roadway location information when a cell phone call is being made.

It is also further desirable to incorporate a hands-free operation indicator signal which will permit cell phone transmission while on the highway in the absence of severe weather information.

The purpose of the present invention, therefore, is to provide a transmission inhibit for digital hand-held cell phones when at specified highway locations and specified other restricted locations or during specified restricted times.

SUMMARY OF THE INVENTION

The objectives of the present invention are realized in an improvement to a cellular telephone system, which incorporates a transmission inhibit system for cell phones being used at specific highway locations and at other specific restricted locations or at elected locations. The restricted locations include those where electric transmissions create a safety hazard, or where cell phone use is prohibited. Such locations may include hospitals, court rooms, penitentiaries, manufacturing locations, religious services, and the like.

A high resolution global positioning system (GPS) circuit is incorporated into a cell phone unit to provide high definition GPS location information. The accuracy of the information provided by this GPS circuit is to within 10 feet or less of actual position.

Each cell phone control signal header is configured to include this GPS location information and other information, including an indicator of the use of a hands-free adaptor (HFA). Each cell base station communications server includes monitoring and control software (MCS). When a cell communications server processes a request for a call, the MCS intercepts the cell phone control signal header information, and analyses it for cell phone condition, GPS location, HFA indicator signal bit presence, "911"

emergency priority status, medical alert status, restricted time status, and the priority of the transmission processing for the call.

Emergency calls, i.e. "911" calls and medical alert calls are connected directly to the transmission channel after a valid cell phone serial number is detected.

For all other calls, the cell phone reported GPS location is compared against each of the stored databases for highway location codes, other restricted location codes, restricted time codes, and elected location codes. When the GPS location of the cell phone is a highway location the HFA indicator bit is searched.

A cell phone call place to or from an on-the-highway location, or with another location in a restricted data base, is rejected and an inhibit message is broadcast before disconnect. Incoming rejected calls can be stored in a temporary "mail box" for each cell phone by telephone number, time and date. Mail boxes are callable from the cell phone. The size of the mail box is determined by a cellular user.

Weather Bureau severe weather reports are compared against the reported GPS location. If the cell phone is determined to be in HFA operation but in a severe weather region, the cell call may be inhibited and a severe weather warning is broadcast.

The monitoring and control circuitry operates on monitoring and control software (MCS) at the cell station communications server location. The system may be configured with one main server and (MCS) location, implemented with a server bank of identical units for increasingly heavier demand. Or the system may be configured as needed with regional servers having regionally positioned monitoring and control circuitry and MCS. When regional servers are employed, the various databases are cached regionally with central or national archiving. Each database storage unit can contain its own control software to reorganize its priority levels of stored information as a function of percentage of use.

A hybrid database storage system will also work. Here data requests are routed to a central storage location which contains duplicate servers to handle increased demand. Frequently requested data many be duplicated and distributed to regional storage. A request for data first looks locally and then nationally for data.

The MCS can be implemented in software compatible with the hardware in which it resides. C language and C++ language are common implementations. The MCS connects all valid calls which are not from on-the-highway locations, or which are from such highway locations, but from HFA units and without severe weather issues.

Each cell phone's microprocessor may be connected to a hands free adaptor (HFA) to receive voice activated preprogrammed dial (VA PPD) information and to activate and deactivate the cell phone operation at preprogrammed voice commands.

A microprocessor driven high resolution GPS circuit is mounted in the cell phone and uses the same antenna as the cell phone telephone transmission circuit. The cell phone microprocessor is programmed to operate from the HFA and to provide a HFA indicator bit. This information, as well as GPS information, is processed by the cell phone protocol encoder/decoder communications processor. A cellular digital packet data (CDPD) modem interfaces the cell unit's communications processor and its transmitter/receiver.

Cell towers which service restricted areas such as prisons and manufacturing facilities may have their controllers programmed to inhibit all transmissions with cell phones which do not provide GPS location information, or inhibit all transmissions with cell phones whose telephone number is not approved, such as the prison warden and the manufacturing executive officer, whose calls would not be inhibited.

DESCRIPTION OF THE DRAWINGS

The features, advantages and operation of the present invention will become readily apparent and further understood from a reading of the following detailed description with the accompanying drawings, in which like numerals refer to like elements, and in which:

FIG. **1** is a system block diagram which shows the highway location inhibit circuitry for digital hand-held cell phones;

FIG. **2** is a circuit block diagram of the circuitry within a cell unit used to implement the present inhibit invention;

FIG. **2***a* is a circuit block diagram of the circuitry within a cell base station communications server **33**, showing a monitor and control computer and the various data base storage devices connected thereto;

FIG. **3** is a block diagram of the cell phone control signal header information utilized by the present inhibit invention; and

FIG. **4** is a logic flow diagram for the monitoring and control software resident within a general process computer comprising the cell base station monitor and control computer of FIG. **2***a*.

FIG. **5** is a circuit block diagram for an on-the-highway detection system;

FIG. **6** shows a block presentation of header information in a cell phone request transmission;

FIG. **7** is a logic flow diagram for the monitoring and control software modification to FIG. **4** where an engine operation bit present in the header; and

FIG. **8** is a circuit block diagram for logic circuitry carrying out engine operation and GPS decision making.

DETAILED DESCRIPTION OF THE INVENTION

The present invention is a monitoring and control system for inhibiting transmissions with hand-held digital cellular telephones (cell phones) when such cell phones are at any of various predetermined inhibit locations, such as "on-highway" locations. Such monitoring and control system will pass emergency "911", medical alert and other emergency and priority calls. The system can be selected to pass calls (transmissions) with cell phones at on-highway locations when such cell phones are in hands-free operation.

The monitoring and control system **11**, FIG. **1**, has each cell phone **13** receive GPS information **15** from a navigational satellite system **17**, such as the United States Defense Department NAVSTAR system which provides civilian global positioning signals for navigational and position locating purposes.

When installed in a motor vehicle, each cell phone **13** is required to be connected to a hands-free adaptor (HFA) **19** for operation. Each HFA **19** has connected to it a speaker **21** and a microphone **23**. A preprogrammed dialer circuit (PPD) **25** is also connected into the HFA **19**.

This hands-free operation is commercially available from cell phone suppliers such as Qualcom, Nokia, Motorola, and others. It permits preprogrammed voice activation and operation (dialing) of a cell phone to which the HFA **19** is connected.

Each cell phone **13** communicates **27** with a local cell tower **29** on assigned frequencies, such as presently assigned between 800 MHZ and 900 MHz, or other frequencies assigned by the Federal Communications Commission (FCC). The United States systems uses a control channel and a transmission channel. The control channel is used to hail a base station communications server and establish a transmission with a particular cell phone unit. Communications are conducted on the transmission channel.

The cell tower **29** is connected to an interface unit **31**. This interface unit **31** contains transceiver (transmitter/receiver) circuitry, digital signal processor (DSP) modem, noise filters, signal amplifiers and time division multi-access (TDMA) and code division multi-access (CDMA) processing circuitry.

A cell base station communications server **33** controls the link between its associated cell tower **29** transmitter/receiver (transceiver) transmission channel operation and the public telephone land lines **35**. Typically, but not necessarily, a cell tower communications server **33** is located at an individual mobile station, and sometimes at the master switching center, which is known as a mobile transport serving office (MTSO). An MTSO links between users in different cells, and between land line telephones **37**. It acts as the gateway to the PSTN (public switched telephone network), i.e. that controlling the network land lines **35**.

The United States National Weather Bureau computer **39** database is connected to the PSTN for accessing regional weather and severe weather locations.

By dividing a service area into small cells that have limited-range transceivers, each cell system can reuse the same frequencies many times. The master switching center (MTSO) operates similarly to a telephone central office and provides links to other offices and individual mobile stations. Each base station supports a specific number of simultaneous calls, sometimes from 3–15 transmissions, and at others, up to 45 simultaneous transmissions, depending upon the underlying technology (CDMA, TDMA, or derivatives).

Most cellular systems provide two types of channels: a control channel and a traffic (transmission) channel. A base station and a mobile station use the control channel to support incoming and outgoing calls, to monitor signal quality, and to register when a user moves into a new zone. The traffic (transmission) channel is used only when the station is off-the-hook and is actually involved in a call.

Control and traffic channels are divided into time slots. When the user initiates access to the control channel to place a call, the respective local mobile station randomly assigns a time slot to the traffic channel. For an incoming call to a mobile station, the base station initiates conversations on the control channel, addressing the mobile station in a time slot which time is reserved for the station reply. When two user's call attempts collide, each are assigned another sub-slot and try again. Repeated rejections are recognized as service being full and additional incoming and outgoing service call requests are rejected.

The master switching center (MTSO), through an element of the user-to-base station connection, monitors the quality of call signals and transfers the call to another base station when the signal quality reaches an unacceptable level due to the distance traveled by the user, obstructions, and/or interference.

Each cell phone **13**, includes a keypad (also called a touch pad) **41**, FIG. **2**. This keypad (touch pad) **41** is connected to provide inputs to the main microprocessor **43** on the cell phone printed circuit (PC) board. Also connected to the main microprocessor **43** is the hands-free adaptor (HFA) **19**, which carries with it a voice activated (VA) preprogrammed dialer (PPD) unit **25**.

Rather than initiating a call by first obtaining a dial tone from the network switching system, as is done with the land line network, a user enters the dialed number into the unit through the VA PPD **25** and HFA **19**. The user then voice initiates a "send" function. Once the network has process the call request, the user will hear conventional call-process signals, such as busy or ringing. To disconnect, an "end" function is voice activate.

Logic and control functions are programmed into the main microprocessor, which includes the Numeric Assignment Module (NAM). The NAM is used for programmable assignment of the unit's telephone number by the service provider and the electronic serial number (ESN) of the unit. Electronic serial numbers are unique to each unit. Typically, the ESN is burned into an EPROM or PROM connected to the main microprocessor **43**.

When a unit is in service, the cellular network interrogates the cell phone for both of these numbers in order to validate that the calling/called cell phone is a valid subscriber. The logic/control component of the units's microprocessor interacts with the cellular network protocols. These protocols determine what control channel the unit should monitor for paging signals and what voice channels the unit should utilize for a specific connection. This logic/control component of the unit's microprocessor also monitors the control signals of cell sites so that the unit and the network can coordinate transitions to adjacent cells.

A high definition (resolution) global positioning system (GPS) circuit **45** is connected to the main microprocessor **43** to provide GPS location information (i.e, position data) **47** to the microprocessor **43**. This GPS location data **47** is sent to the network cell station through the unit's main microprocessor **43** along with a HFA bit **49** and the unit's preprogrammed logic/control information and other transmission request data. During a call, the main microprocessor also processes the voice transmission digitized data **51**.

A protocol encoder/decoder communications processor **53** translates the information sent from the cell phone unit and received by the cell phone unit with the proper protocols of the cell system operation. Digitized packet data **55** is exchanged bi-directionally with a cellular digital packet data (CDPD) modem **57**. This CDPD modem **57** is connected to the unit's transceiver (transmitter/receiver) **59**. The transceiver **59** and the high resolution GPS detector circuit **45** are each connected to the unit's antenna (not shown). The transmitter/receiver **59** communicates with a local cell tower **29** through this antenna.

To be accurate for normal on-the-highway positioning, the GPS locationing circuit **45** should provide an accuracy within about 10 feet. Signal accuracy to five (5) decimal places would provide accuracy of approximately three (3) feet. Accuracy of plus or minus 0.00002 degrees (longitude and latitude) would provide an accuracy of about seven (7) feet. NAVSTAR provides such accurate signals, however they are not yet made available for civilian uses because of NAVSTAR's selective ability (SA) encryption. The NAVSTAR GPS signals available for civilian uses have been partially encrypted to provide an accuracy of about a 20 to 60 foot radius. This error (accuracy) is not acceptable for the present invention.

The high resolution GPS circuit **45**, therefore contains a WAAS (wide-area augmentation system) circuit such as

available in the marketplace from Raytheon Systems, Inc, Lexington, Mass. This circuit provides WAAS differential GPS service. WAAS utilizes ground stations that compare satellite GPS signal position readouts to each station's known position. The ground stations provide a differential correction signal as a function of location from each ground station.

The main microprocessor **43** may be implemented by any suitable, commercially available, microprocessor unit. An example is a Net+Arm Technology, Inc. model 12, which is a 32 bit microprocessor running nominally at 25 MHz, with adjustments in the range 12–36.8 MHz. C family programming languages may be used. The protocol encoder/decoder **53** may be implemented with a similar microprocessor, or an Intel Corporation, Pentium® I, or higher running Microsoft Corporation, WINDOWS C/E®. It can also be implemented in an Intel Corporation, Pentium® RTM based microprocessor using Microsoft Corporation RTM operating system for Microsoft Corporation Windows® RTM 95.

It may also be implemented in a communications commercially available Altera Corporation, field programmable gate array, using AHLDL (Altera High Level Design Language) in hexadecimal code.

The CDPD modem **57** is available in the marketplace for various vendors, including Rockwell International, Inc., Motorola Corp, and Ambient Inc.

A unit of transmission in ATM (asynchronous transfer mode) and in SMDS (switched multi-megabit data services operation), is the cell packet. The fixed-size cell packet is 53 octets (bytes) long. A packet header read and operated upon by the monitoring and control transmission inhibit circuitry of the is invention precedes the initiation of the communication transmission data.

Within each cell base station communications server **33** is a communication server processor computer **20**, FIG. **2***a*. This computer **20**, which performs call routing, is implemented with any of the processors identified above or any other computer used by local telephone or cell providers in the marketplace. A dedicated monitor and control computer **22** is connected for two-way communications with the communication server computer **20**. This monitor and control computer **22** is likewise connected for two-way communications with each cell tower **31** served by the station. Again, implementation of this monitor and control computer may be with any of the computers identified previously, or substitutes or replacements for them.

The monitor and control computer **22** accesses a plurality of separate databases specific to the service area of the base station. Each database is held in a dedicated storage space such a hard drive. Shown connected to the computer **22** are restricted transmission data for GPS: highway locations **24**; business locations **26**; user personal locations **28**; user time restrictions **30**; weather location restrictions **32**; high-risk locations **34**; telephone number restrictions **36**; and other restriction data which may be selected **38**.

The cell control channel request from a cell phone unit comprises a request control packet of up to 53 bytes (octets) of data, which follows the following information field protocol, FIG. **3**:

PES header
ISO header
Sender telephone number (cell phone)
Serial number of cell phone
Emergency priority request
GPS location
HFA bit
Call telephone number (call request

This packet is graphically represented in FIG. **3**, reading from left to right.

In ATM, the system is presented with each 53 byte packet in asynchronous fashion on a start-stop basis. This requires enhanced recognition software and limits simultaneous transmissions, for a given bandwidth and communications server capacity. SMDS is more suitable for LAN to LAN interconnection, and generally offers T-3 bandwidth (45 Mbps). In cell-switched service it offers excellent congestion control because each packet must have a header and trailer portion, which each contain network control information. Protocol data Units (PDU) are utilized.

The monitoring and control circuitry of the present invention, being software implemented, is resident in computer memory at the cell base station communications server **33**. This software performs logical decision making shown in the logic flow diagram of FIG. **4**. When a call request is received **63**, it is determined if it is from a land line **65** (the alternative being from a cell phone). If the call request is from a cell phone, the cell phone request is read **67**, and then the data is validated, step **69**, by transmitting back to the cell phone to confirm the accurate receipt of the information. Once determined that the information was correctly received, the cell phone ESN is determined valid or not **71**. If not valid, the transmission is disconnected and a disconnect message is transmitted to the sender **73**.

If the serial number (ESN) is valid, it is determined if the request is for an emergency "911" call or other priority call such as a medical alert, step **75**. If the call is a "911" or a medical alert, the cell phone GPS location already received is sent to emergency services **77**, or respectively the medical alert message and GPS location is sent to its respective emergency service **76**, with both calls being provided with a priority connection to the transmission channel (traffic channel) **79**.

If there is no emergency call, the cell telephone number is then validated against the service provider's database. If it is not valid a disconnect message **73** is generated. If it is valid, the cell phone location from GPS data is checked against the roadway database to determine if the cell user is on-the-highway, step **83**. If it is not, it is then checked against each of the other data bases of FIG. **2***a* in turn **78**. It there is a "hit", i.e. valid comparison with any other database, (business location **26**, user personal location **28**, user time restriction **30**, high risk location, telephone number for location restriction **34**, or other location restriction **38**), an inhibit message is generated **80** and the time and telephone number of the caller is sent to the subscriber's mail box **82**. Once a first "hit" is made, the search through any remaining un-searched databases is discontinued.

If no comparisons are made in step **78**, the call is connected to the transmission (traffic) channel, step **85**.

If the cell unit is determined to be on-the-highway in step **83**, the cell unit location is then checked a current database compiled from the U.S. Weather Bureau to determine severe weather conditions at the cell unit location, step **87**. If severe conditions exist, an inhibit message is sent to the call requester and an appropriate weather warning is annunciated **89**.

If no severe weather is determined at step **87**, the HFA data is interrogated to determine if the cell unit is on hands-free operation, step **91**. If not an inhibit message is sent **93**. If there is a HFA indicator, the call is passed to the transmission (traffic) channel **85**.

In step **65**, if the call request is from the land line network, the cell phone telephone number is read and checked against

ESN and other data in the service provider's database **95**. A control transmission is then sent to the cell unit and it is determined if the cell unit is in service, step **97**. If the cell unit is out of service, a disconnect message is generated to the requesting caller, step **99**.

If the cell unit responds, the units control and identification data is confirmed against that resident in the cell unit memory, step **101**. If the unit has a valid serial number, step **103**, the fact that its telephone number (service state) is valid is also confirmed, step **105**. If either the serial number (ESN) or the cell telephone number are invalid, the disconnect message **99** is generated. If they are both valid, the process passes onto step **83**, GPS location determination against the highway database, as in the cell unit originated call previously discussed. Subsequent process steps are carried out.

It is understood that after a disconnect message or an inhibit message is generated, the cell phone is disconnected from service by the service provider.

A redundant or substitute on-the-highway detection system can include a 2 KHz to 100 KHz AM (amplitude) radio noise receiver **105**, FIG. **5**. In the presence of engine noise, a small logic circuit, such as an A/D converter, or a logic gate, provides an engine noise present bit to the main microprocessor **43**. This processor **43**, in turn transmits this bit, being indicative an on-the-highway status, to the protocol encoder/decoder **53**. A further redundant detection system is a motion detector circuit which detects a change of GPS position at a rate faster than walking or jogging.

This engine operation bit is placed in the control signal header information **61***a*, FIG. **6**, behind the GPS location information and before the HFA bit. This control information is automatically transmitted to a cell station when a call request is processed.

The monitoring and control software resident at the communications server, is modified from that described in connection with FIG. **4**, as shown in FIG. **7**. Following the validation of the cell phone telephone number, step **81**, the cell request control information is interrogated to determine if an engine operating bit is present, step **109**. (Presence in this means that the bit has been changed from "0" to a logical "1".)

If there is no engine operation or motion, the call is connected to the transmission channel, step **85***a*. If there is an engine operating bit, then severe weather, step **87***a*, and HFA, step **91***a*, are interrogated as previously. An inhibit message and weather warning **89***a*, or an inhibit message **93***a*, or connection to a transmission channel, step **85***a*, results as previously.

Where the engine operation bit is used as an alternative to the GPS location, the logic of FIG. **7** is substituted for the relevant portion of the logic of FIG. **4**. However, where the engine operation bit is used in parallel, i.e. redundant backup for the GPS determination, additional logic must be inserted in the connection to transmission channel step **85** or **85***a*. This logical decision is illustrated in FIG. **8**. Specifically, where there is an indication from GPS or engine operation, but not both, that the cell unit is on-the-highway, the consensus is that the unit is on-the-highway.

Referring to FIG. **8**, when the engine operation is present, the engine gate **111** has a logical "high" output. When the GPS location matches GPS highway data, the GPS gate **113** has a logical "high" output. These outputs are passed through an "OR" decision circuit **115** which produces a "high" output when either of the inputs is "high". When a HFA is sensed as present, the HFA gate **117** output is a "1". Further, when severe weather is detected at the cell phone GPS location, the severe weather gate **119** output is a "1".

The output from HFA gate **117** is input to an inverting input of a further "AND" decision logic circuit **121**. The output from the OR circuit **115** is input to a non-inverting input terminal of the AND circuit **121**. When the input from the OR circuit **115** is "high" and the input from the HFA gate **117** is "low", the output of AND circuit **121** is "high". A "1" output from the AND circuit **121** is connected to generate an inhibit signal and to refuse the transmission of the cell call **123**.

The output of the OR circuit **115** is input to yet another AND decision circuit **125**. A second input of this AND circuit **125** is connected to the output of the severe weather gate **119**. In the presence of two "high" signals, the AND circuit **125** generates a "high" output. This logical "1" is connected to generate and inhibit signal, a weather warning and to refuse the transmission of the cell call **127**.

A last AND circuit **129** is connected to the output of the OR circuit **115** and the HFA gate **117**. In the presence of two "highs", this AND circuit **129** produces a "High" which causes the cell call to be connected to the transmission channel **131**.

Many changes can be made in the above-described invention without departing from the intent and scope thereof. It is thereby intended that the above description be read in the illustrative sense and not in the limiting sense. Substitutions can be made in the depth and dimensions stated above and for the wear and other tolerances rendered thereby.

What is claimed is:

1. A monitoring and control system for cellular telephone transmission for inhibiting transmissions with a cell phone in a on-the-highway location, said cell phone communicating with a cell tower including a base station having a communications server, said cell phone having a main microprocessor, an operator touch pad connected to input to said main microprocessor, a protocol encodcr/decodcr circuit connected to said main processor, a modem connected to said protocol encoder/decoder circuit, and a transceiver connected to said modem, comprising:

a high definition GPS location receiver circuit connected to receive satellite GPS information through said cell phone antenna, and connected to said main processor for providing GPS location data of said cell phone to said main processor;

a hands-free adaptor (HFA) connected to input to said main processor, said input providing operation signals to said main processor;

a cell unit GPS location data line from said main processor to said protocol encoder/decoder circuit;

a HFA presence bit line from said main process to said protocol encoder/decoder circuit, said bit being "high" when said hands-free adaptor is connected and operational;

a transmission data line from said main processor to said protocol encoder/decoder circuit;

wherein said encoder/decoder formats the request for transmission call to a cell tower, said request including cell phone GPS location data and a HFA presence indicator bit; and

detection software resident in the communications server for said cell tower being requested for transmission, said software interrogating said cell phone transmission request, including the reading of said cell phone GPS location information and said cell phone HFA bit information, said software inhibiting further transmission with said cell phone when said cell phone is at an on-the-highway location without HFA presence.

2. The monitoring and control system of claim 1 also including:

an AM noise receiver connected to receive radio frequency noise generated by an operating engine through said cell phone antenna, and connected to said main processor for providing a noise presence bit to said main processor in the presence of engine operating noise; and

an engine operation, on-the-highway indicator bit line from said main processor to said protocol encoder/decoder circuit.

3. The monitoring and control system of claim 2 wherein said AM noise receiver includes a 2 KHz–110 KHz noise receiver connected to receive radio frequency noise generated by an operating engine through said cell phone antenna, and connected to said main processor for providing a noise presence bit to said main processor in the presence of engine operating noise.

4. The monitoring and control system of claim 1 wherein said cell tower base station communications server is connected to receive weather bureau information of severe weather by GPS location, and wherein said cell phone transmission is denied when said cell phone is at a severe weather location.

5. The monitoring and control system of claim 4 wherein said detection software at said communications server performs the following steps:

determining if a call request is from a land line;

if not from a land line, reading the cell phone request information including emergency priority request ("911"), cell phone GPS location, HFA bit presence, engine noise bit presence;

validating the request information;

validating the cell phone EDN, and if not valid disconnecting;

determining if a "911" emergency call, and if so, sending cell unit GPS location to emergency services and providing a priority connection to the transmission channel;

validating cell phone telephone number, and if not valid disconnecting;

determining if an engine operation, on-the-highway indicator bit is present, and if not then connecting the cell phone to a transmission channel;

if an engine operation, on-the-highway indicator bit is present, then determining if there is sever weather at the cell phone GPS location, and if so rejecting the cell call request and disconnecting;

if an engine operation, on-the-highway indicator bit is present, and there is determined no severe weather at the cell phone GPS location, then determining HFA presence and operation, if not then disconnecting; and

when the engine operation, on-the-highway indicator bit is present, there is no severe weather at the cell phone GPS location, and the HFA bit is present, then connecting the cell phone to a transmission channel.

6. The monitoring and control system of claim 1 wherein said detection software at said communications server performs the following steps:

determining if a call request if from a land line;

if not from a land line, reading the cell phone request information including emergency priority request ("911"), cell phone GPS location, HFA bit presence, engine noise bit presence;

validating the request information;

validating the cell phone EDN, and if not valid disconnecting;

determining if a "911" emergency call, and if so, sending cell unit GPS location to emergency services and providing a priority connection to the transmission channel;

validating cell phone telephone number, and if not valid disconnecting;

comparing cell phone GPS location with highway GPS database to determine if cell phone on-the-highway, and if not then connecting the cell phone to a transmission channel;

if the cell phone GPS location is on-the-highway, then determining if there is severe weather at that GPS location, and if so rejecting the cell call request and disconnecting;

if the cell phone GPS location is on-the-highway, and there is determined no severe weather at that GPS location, then determining HFA prsence and operation, if not then disconnecting; and

when the cell phone GPS location is on-the-highway, there is no severe weather at that GPS location, and the HFA bit is present, then connecting the cell phone to a transmission channel.

7. A method of inhibiting transmissions with a cell phone in a prohibited situation in an existing cellular telephone transmission system, where each cell phone has GPS position signal reception and high definition location calculation, with a programmed monitoring and control circuit interposed before a base station communications server to interrupt cell phone transmissions to or from said base station communications server, comprising the steps of:

placing said cell phone GPS location in the transmission request header format of said cell phone transmission;

storing data of prohibited situations for said cell phone transmission;

intercepting each transmission request to and from said cell phone and comparing said cell phone header to said stored prohibited situation data; and

inhibiting transmission between said cell phone and said cellular telephone transmission system if said prohibited situation data is matched

also including after the step of inhibiting transmission the steps of:

establishing a mail box for said cell phone;

placing the time and telephone number of said cell phone for which transmission was inhibited in said mail box; and

sending an inhibit message to said cell phone for which transmission was inhibited

also including after the step of intercepting each transmission request the steps of:

determining if said transmission request is from a cell phone and if said transmission request is an emergency call; and

permitting said call to go through without inhibiting transmission if it is an emergency call;

wherein said storing data of prohibited situations step includes storing GPS location data of on the highway locations; and wherein said comparing step includes comparing said cell phone header GPS location information to said stored GPS location data of on the highway locations.

8. The method of claim 7 wherein said storing data of prohibited situations step further also includes establishing

plural stored databases of separate GPS location data of any of restricted transmission business locations, restricted transmission high risk area locations, cell user elected locations, and cell user elected time restrictions; and wherein said comparing step includes comparing said cell phone header information to said plural database data.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,799,052 B2
DATED : September 28, 2004
INVENTOR(S) : Agness et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 10,
Line 31, replace "in a on-the-highway location" with -- in a on-the-highway location --;
Line 49, replace "process" with -- processor --;

Column 11,
Line 62, replace "request if from" with -- request is from --;

Column 12,
Line 10, replace "phone on-the-highway" with -- phone is on-the-highway --;
Line 61, replace "on the highway" with -- on-the-highway --;
Lines 64-65, replace "on the highway" with -- on-the-highway --.

Signed and Sealed this

Twenty-eighth Day of June, 2005

JON W. DUDAS
Director of the United States Patent and Trademark Office

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/849,715	05/04/2001	Bilhan Kirbas	UTL 00013	9648

32968 7590 10/20/2009

KYOCERA WIRELESS CORP.
P.O. BOX 928289
SAN DIEGO, CA 92192-8289

EXAMINER	
DANIEL JR, WILLIE J	

ART UNIT	PAPER NUMBER
2617	

MAIL DATE	DELIVERY MODE
10/20/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/849,715	KIRBAS ET AL.	
	Examiner	Art Unit	
	WILLIE J. DANIEL JR	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *46,48 and 59-67* is/are pending in the application.

4a) Of the above claim(s) *59-62* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *46,48 and 63-67* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to applicant's amendment filed on 29 June 2009. **Claims 46, 48, and 59-67** are now pending in the present application and **claims 1-45, 47, and 49-58** are canceled. This office action is made **Final**.

Election/Restrictions

2. Newly submitted **claim 59** (including dependent 60-62) are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

   a. **Claim 59** recites the limitations "…storing in a read only memory of the wireless communication device a plurality of communication characteristics comprising information **regarding accrual of charges for communications associated with particular communication characteristics**; receiving the requested communication, the requested communication having a communication characteristic; accessing the plurality of communication characteristics stored in read only memory of the wireless communication device; determining whether the requested communication **will accrue a charg**e based on an evaluation of the plurality of communication characteristics and the requested communication; and providing a response to the requested communication indicating that the requested communication is unauthorized…." in line(s) 5-17 of the claim.

   Regarding claim 59, the limitations present an independent and/or distinguishable aspect of the claims that clearly differs from the originally presented invention.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 59-62 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

3. This list of examples is not intended to be exhaustive.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 46, 48, and 63-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schmidt (US 6,208,872 B1)** with evidentiary support by **Rodriguez (US 7,212,802 B1)** in view of **Irvin (US 6,556,819 B2)**.

Regarding **claim 46**, Schmidt discloses a wireless communication device (see col. 6, lines 4-16; Fig. 2), comprising:

a read only memory (58) for storing a list comprising area codes (e.g., phone number - home system or prohibited), at least a portion of which are authorized area codes (e.g., home system) (see abstract; col. 7, lines 46-59,27-40; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112'), where incoming or outgoing calls are permitted based on phone number and location and the memory stores phone numbers in a phone book, and where the user of the mobile station (28) is able to dial phone numbers to

originate a call to another communication device in which the phone number is a 10-digit number that has an area code (see col. 6, lines 15-16,27-45; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2, 3, and 5 'ref. 82')as evidenced by the fact that one of ordinary skill in the art would clearly recognize and where incoming or outgoing calls are permitted based on phone number and location (see abstract; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112');

the read only memory (58) also for storing one or authorized geographic areas (e.g., home system or roaming), wherein each authorized geographic area comprises absolute or relative position (e.g., geographic area 74, 76, 78, 80) information (see col. 7, lines 46-59,27-40; Figs. 4 and 5 'ref. 84'), where the mobile station is able to determine the location and to check as to whether the station is roaming;

a user interface (e.g., call initiator 36) accepting an inputted phone number (e.g., phone number) having an area code (e.g., phone number) (see col. 5, lines 50-54,60-62; col. 6, lines 7-8; col. 7, lines 42-44; Figs. 2 and 5 'ref. 82'), where the user of the mobile station (28) dials the phone number of another communication device in which the phone number is a 10-digit number that has an area code;

determining a current location (e.g., geographic area 74, 76, 78, 80) of the wireless communication device (28) (see col. 7, lines 46-59,27-40; Figs. 4 and 5 'ref. 84'), where the mobile station is able to determine the location and to check as to whether the station is roaming;

a processor (54) which reads on the claimed "controller" connected to the read only memory (58), the user interface (36) (see col. 6, lines 4-16,27-28; Fig. 2), where the mobile station has a transceiver (30),

the controller (54) configured to (see col. 6, lines 15-16; Fig. 2)

determine whether the inputted phone number will incur a charge based on an evaluation of at least the area code (e.g., phone number) (see col. 6, lines 15-16,27-45; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2, 3, and 5 'ref. 82'), where the memory (58) stores phone numbers in a phone book, and where the user of the mobile station (28) is able to dial phone numbers to originate a call to another communication device in which the phone number is a 10-digit number that has an area code (see col. 5, lines 51-54,60-62; col. 6, lines 7-8; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2 & 5 'ref. 82'), and where the phone numbers and the associated information are considered acceptable and independent of location in which the will in a charge would be implicit to allow an incoming/outgoing call (see col. 7, lines 9-11; col. 1, lines 48-53) as evidenced by the fact that one of ordinary skill in the art would clearly recognize,

the current location (e.g., geographic area 74, 76, 78, 80) (see col. 7, lines 46-59,27-40; Figs. 4 and 5 'ref. 84'), where the mobile station has a memory (58) and is able to determine the location and to check as to whether the station is roaming and where the determinator (40) provides location information to the processor (54) (see col. 6, lines 15-16; col. 7, lines 46-59,27-40; Figs. 2, 4, and 5 'ref. 84'), and

the list comprising area codes (e.g., phone number - home system or prohibited) and the one or more authorized geographic areas stored in the read only memory (58) (see col. 6,

lines 15-16; col. 7, lines 46-59,27-40; col. 1, lines 48-53; Figs. 2, 4, and 5 'ref. 84'), where the determinator (40) provides location information to the processor (54) and where incoming or outgoing calls are prohibited when roaming based on phone number and location (see col. 8, lines 6-10; col. 9, lines 14-18,45-50; Figs. 5 'ref. 92' and 6a 'ref. 124 & 128') and where incoming or outgoing calls are permitted based on phone number and location (see abstract; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112'),

wherein the controller is further configured to permit placement of a phone call to the inputted phone number only if the area code is an authorized area code (e.g., phone number - home system or prohibited) and the current location (e.g., geographic area 74, 76, 78, 80) of the wireless device (28) is within an authorized geographic area (e.g., home system) (see abstract; col. 7, lines 46-59,27-40; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112'), where incoming or outgoing calls are permitted based on phone number and location and the memory stores phone numbers in a phone book, and where the user of the mobile station (28) is able to dial phone numbers to originate a call to another communication device in which the phone number is a 10-digit number that has an area code (see col. 6, lines 15-16,27-45; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2, 3, and 5 'ref. 82')as evidenced by the fact that one of ordinary skill in the art would clearly recognize.

As further support of Schmidt disclosing of the claim feature a list comprising area codes (e.g., phone number) (see col. 5, lines 50-54; col. 7, lines 9-11,42-44; Fig. 5 'ref. 82'), Rodriguez at the least explicitly discloses "*…the number entered is compared…the area*

code and the dialing prefix, i.e., the first 3 of 7 numbers...compared to a set of authorized pairs of area codes…" (see Rodriguez - col. 8, lines 1 et seq.]). Schmidt does not specifically disclose having the feature(s) a global positioning system (GPS) device for determining a current location of the wireless communication device; a controller connected to the GPS device, the controller configured to determine the current location. However, the examiner maintains that the feature(s) a global positioning system (GPS) device for determining a current location of the wireless communication device; a controller connected to the GPS device, the controller configured to determine the current location was well known in the art, as taught by Irvin.

Irvin further discloses the feature(s) a global positioning system (GPS) device (160) for determining a current location of the wireless communication device (100) (see col. 4, lines 29-39; Fig. 4 'ref. 440'), where the GPS receiver (160) is able to determine the physical location of the terminal (100);

a control unit (102) which reads on the claimed "controller" connected to the GPS device (160) (see Fig. 2),

the controller (102) configured to determine the current location (see col. 4, lines 29-39; Fig. 4 'ref. 440'), where the GPS receiver (160) is able to determine the location of the terminal (100). As additional support, Irvin at the least further discloses having the feature(s) a read only memory (170) for storing a list comprising area codes (i.e., digit) (see col. 6, lines 1-18,33-37; Fig. 4 'ref. 460 & Fig. 4 ref. 470'), where the control unit compares the terminal (100) to the safe zones; area comprises absolute or relative position information (e.g., geocoordinates) (see col. 6, lines 3-39; col. 4, lines 29-39), where the GPS receiver (160) is

able to determine the physical location of the terminal (100) in correlation to safe zones; a controller (102) connected to the read only memory (150, 170), the user interface (108) (see Fig. 2), where the terminal has a transmitter 120 and receiver 140); and wherein the controller is further configured to permit placement (i.e., dialing) of a phone call to the inputted phone number only if the area code is an authorized area code and the current location of the wireless communication device is within an authorized geographic area (e.g., safe zone) (see col. 6, lines 1-18,33-37; Fig. 4 'ref. 460 & Fig. 4 ref. 470'), where the control unit compares the terminal (100) to the safe zones. In addition, the control unit compares the terminal (100) to the safe zones (see col. 6, lines 1-18,33-37; Fig. 4 "ref. 460") and the user enters a command (e.g., SEND) to attempt (e.g., call origination) to connect with a calling party based on the dialed numbers (see col. 4, lines 22-28, 48-51), where the phone is determined to be in a safe zone in which the placing of a call would be implicit for the dialing of a number (see col. 6, lines 3-39; col. 3, lines 39-42).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Schmidt (as supported by Rodriguez) and Irvin to have the feature(s) a global positioning system (GPS) device for determining a current location of the wireless communication device; a controller connected to the GPS device, the controller configured to determine the current location from the GPS device, in order to enable and disable security features for portable electronic devices based on location of the device, as taught by Irvin (see col. 2, lines 8-10).

Regarding **claim 48**, the combination of Schmidt (as supported by Rodriguez) and Irvin discloses every limitation claimed, as applied above (see claim 46), in addition Schmidt

further discloses the wireless communication device of claim 46, wherein at least a portion of the list comprising area codes are unauthorized area codes (see col. 5, lines 51-54; col. 7, lines 38-40; Figs. 2-4), where the system has information stored in the memory (58); and

wherein the controller (54) is configured to block a phone to the inputted number if the area code is an unauthorized area code or the current location of the wireless communication device matches a predetermined physical location is not within an authorized geographic area (see col. 8, lines 6-10; col. 9, lines 14-18,45-50; Figs. 5 'ref. 92' and 6a 'ref. 124'), where incoming or outgoing calls are prohibited when roaming based on phone number and location stored in memory (58) in which the phone number is a 10-digit number that has an area code (see col. 5, lines 51-54).

Regarding **claim 63**, Schmidt discloses a method for restricting a requested communication on a wireless communication device, comprising:

storing in a read only memory (58) of the wireless communication device (28) one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position (e.g., geographic area 74, 76, 78, 80) information (see col. 7, lines 46-59,27-40; Figs. 4 and 5 'ref. 84'), where the mobile station is able to determine the location and to check as to whether the station is roaming;

storing a the read only memory (58) of the wireless communication device (28) one or more authorized telephone number area codes (e.g., phone number) (see col. 6, lines 27-34,46-63; col. 7, lines 46-54; Figs. 2-4), where the memory stores information for permitting or prohibiting an incoming and outgoing call based on the phone number and location and where the determinator (40) provides location information to the processor (54) (see col. 6,

lines 15-16; col. 7, lines 46-59,27-40; col. 1, lines 48-53; Figs. 2, 4, and 5 'ref. 84') and where incoming or outgoing calls are prohibited when roaming based on phone number and location (see col. 8, lines 6-10; col. 9, lines 14-18,45-50; Figs. 5 'ref. 92' and 6a 'ref. 124 & 128') and where incoming or outgoing calls are permitted based on phone number and location (see abstract; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112');

receiving the requested communication, wherein the requested communication comprises a telephone number having an area code (e.g., home system) (see abstract; col. 7, lines 46-59,27-40; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112'), where incoming or outgoing calls are permitted based on phone number and location and the memory stores phone numbers in a phone book, and where the user of the mobile station (28) is able to dial phone numbers to originate a call to another communication device in which the phone number is a 10-digit number that has an area code (see col. 6, lines 15-16,27-45; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2, 3, and 5 'ref. 82')as evidenced by the fact that one of ordinary skill in the art would clearly recognize;

determining whether the area code of the requested communication telephone number is an authorized telephone number area code (e.g., phone number) stored in the read only memory (58) of the wireless communication device (e.g., home system) (see abstract; col. 7, lines 46-59,27-40; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112'), where incoming or outgoing calls are permitted based on phone number and location and the memory stores phone numbers in a phone book, and where the user of the mobile station (28) is able to dial phone numbers to originate a call to another

communication device in which the phone number is a 10-digit number that has an area code (see col. 6, lines 15-16,27-45; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2, 3, and 5 'ref. 82')as evidenced by the fact that one of ordinary skill in the art would clearly recognize;

identifying a current location (e.g., geographic area 74, 76, 78, 80) of the wireless communication device (28) (see col. 7, lines 46-59,27-40; Figs. 4 and 5 'ref. 84'), where the mobile station is able to determine the location and to check as to whether the station is roaming;

determining whether the current location (e.g., geographic area 74, 76, 78, 80) of the wireless communication device (28) is within an authorized geographic area (e.g., geographic area 74, 76, 78, 80) stored in the read only memory (58) of the wireless communication device (28) (see col. 7, lines 46-59,27-40; Figs. 4 and 5 'ref. 84'), where the mobile station has a memory (58) and is able to determine the location and to check as to whether the station is roaming and where the determinator (40) provides location information to the processor (54) (see col. 6, lines 15-16; col. 7, lines 46-59,27-40; Figs. 2, 4, and 5 'ref. 84');

initiating a call to the telephone number in the requested communication only if the area code (e.g., phone number) of the requested communication telephone number is an authorized telephone number area code and the current location of the wireless communication device (28) is within an authorized geographic area (e.g., home system) (see abstract; col. 7, lines 46-59,27-40; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112'), where incoming or outgoing calls are permitted based on phone number and location and the memory stores phone numbers in a phone book, and where the user of the mobile station (28) is able to dial phone numbers to originate a call to

another communication device in which the phone number is a 10-digit number that has an area code (see col. 6, lines 15-16,27-45; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2, 3, and 5 'ref. 82')as evidenced by the fact that one of ordinary skill in the art would clearly recognize.

As further support of Schmidt disclosing of the claim feature area codes (e.g., phone number) (see col. 5, lines 50-54; col. 7, lines 9-11,42-44; Fig. 5 'ref. 82'), Rodriguez at the least explicitly discloses "*…the number entered is compared…the area code and the dialing prefix, i.e., the first 3 of 7 numbers...compared to a set of authorized pairs of area codes…*" (see Rodriguez - col. 8, lines 1 et seq.]). Schmidt inexplicitly discloses having the feature(s) identifying a current location of the wireless communication device; determining the current location of the wireless communication device. However, the examiner maintains that the feature(s) identifying a current location of the wireless communication device; determining the current location of the wireless communication device was well known in the art, as taught by Irvin.

Irvin further discloses the feature(s) identifying a current location of the wireless communication device (100) (see col. 4, lines 29-39; Fig. 4 'ref. 440'), where the GPS receiver (160) is able to determine the physical location of the terminal (100);

determining the current location of the wireless communication device (100) (see col. 4, lines 29-39; Fig. 4 'ref. 440'), where the GPS receiver (160) is able to determine the location of the terminal (100). As additional support, Irvin at the least further discloses having the feature(s) a read only memory (170) for storing a list comprising area codes (i.e., digit) (see col. 6, lines 1-18,33-37; Fig. 4 'ref. 460 & Fig. 4 ref. 470'), where the control unit compares

the terminal (100) to the safe zones; and initiating (i.e., dialing) a call to the telephone number in the requested communication only if the area code of the requested communication telephone is an authorized telephone number area code and the current location of the wireless communication device is within an authorized geographic area (e.g., safe zone) (see col. 6, lines 1-18,33-37; Fig. 4 'ref. 460 & Fig. 4 ref. 470'), where the control unit compares the terminal (100) to the safe zones. In addition, the control unit compares the terminal (100) to the safe zones (see col. 6, lines 1-18,33-37; Fig. 4 "ref. 460") and the user enters a command (e.g., SEND) to attempt (e.g., call origination) to connect with a calling party based on the dialed numbers (see col. 4, lines 22-28, 48-51), where the phone is determined to be in a safe zone in which the placing of a call would be implicit for the dialing of a number (see col. 6, lines 3-39; col. 3, lines 39-42).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Schmidt (as supported by Rodriguez) and Irvin to have the feature(s) identifying a current location of the wireless communication device; determining the current location of the wireless communication device, in order to enable and disable security features for portable electronic devices based on location of the device, as taught by Irvin (see col. 2, lines 8-10).

Regarding **claim 64**, Schmidt discloses every limitation claimed as applied above in claim 63. Schmidt does not specifically disclose having the feature(s) wherein the current location is an absolute global positioning system position. However, the examiner maintains that the feature(s) wherein the current location is an absolute global positioning system position was well known in the art, as taught by Irvin.

Irvin further discloses the feature(s) wherein the current location is an absolute global positioning system position (e.g., geocoordinates) (see col. 6, lines 3-39; col. 4, lines 29-39), where the GPS receiver (160) is able to determine the physical location of the terminal (100).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Schmidt (as supported by Rodriguez) and Irvin to have the feature(s) wherein the current location is an absolute global positioning system position, in order to enable and disable security features for portable electronic devices based on location of the device, as taught by Irvin (see col. 2, lines 8-10).

Regarding **claim 65**, Schmidt discloses every limitation claimed as applied above in claim 63. Schmidt does not specifically disclose having the feature(s) wherein the current location is a relative global positioning system position. However, the examiner maintains that the feature(s) wherein the current location is a relative global positioning system position was well known in the art, as taught by Irvin.

Irvin further discloses the feature(s) wherein the current location is a relative global positioning system position (see col. 6, lines 3-39; col. 4, lines 29-39), where the GPS receiver (160) is able to determine the physical location of the terminal (100) relative to safe zones.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Schmidt (as supported by Rodriguez) and Irvin to have the feature(s) wherein the current location is a relative global positioning system position, in order to enable and disable security features for portable electronic devices based on location of the device, as taught by Irvin (see col. 2, lines 8-10).

Claims 66-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schmidt** (**US 6,208,872 B1**) with evidentiary support by **Rodriguez** (**US 7,212,802 B1**) in view of **Irvin** (**US 6,556,819 B2**) as applied to claim 41 above, and further in view of Admitted prior art (**MPEP 2144.03**).

Regarding **claim 66**, the combination of Schmidt (as supported by Rodriguez) and Irvin discloses every limitation claimed as applied above in claim 41. The combination of Schmidt and Irvin does not specifically disclose having the feature local toll charges. However, the examiner takes official notice of the fact that it was well known in the art to have the feature local toll charges.

As a note, one of ordinary skill in the art would clearly recognize that the feature local toll charges are common knowledge. For example, a mobile station can originate/receive a call and may incur roaming charges (e.g., local toll charges) when not within the home area.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmidt (as supported by Rodriguez) and Irvin by specifically having the feature local toll charges, for the purpose of having local toll charges in memory to restrict calls and/or billing usage (see Schmidt - col. 1, lines 13-36, 41-48).

Regarding **claim 67**, the combination of Schmidt (as supported by Rodriguez) and Irvin discloses every limitation claimed as applied above in claim 41. The combination of Schmidt and Irvin does not specifically disclose having the feature long distance charges. However, the examiner takes official notice of the fact that it was well known in the art to have the feature long distance charges.

As a note, one of ordinary skill in the art would clearly recognize that the feature long distance charges are common knowledge. For example, a mobile station can originate/receive a call and may incur roaming charges (e.g., long distance charges) when not within the home area.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmidt (as supported by Rodriguez) and Irvin by specifically having the feature long distance charges, for the purpose of having long distance charges in memory to restrict calls and/or billing usage (see Schmidt - col. 1, lines 13-36, 41-48).

Claims 46 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schmidt** (**US 6,208,872 B1**) with evidentiary support by **Rodriguez** (**US 7,212,802 B1**) in view of **Agness et al**. (hereinafter Agness) (**US 6,799,052 B1**).

Regarding **claims 46**, Schmidt discloses a wireless communication device (see col. 6, lines 4-16; Fig. 2), comprising:

a read only memory (58) for storing a list comprising area codes (e.g., phone number - home system or prohibited), at least a portion of which are authorized area codes (e.g., home system) (see abstract; col. 7, lines 46-59,27-40; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112'), where incoming or outgoing calls are permitted based on phone number and location and the memory stores phone numbers in a phone book, and where the user of the mobile station (28) is able to dial phone numbers to originate a call to another communication device in which the phone number is a 10-digit

number that has an area code (see col. 6, lines 15-16,27-45; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2, 3, and 5 'ref. 82') as evidenced by the fact that one of ordinary skill in the art would clearly recognize and where incoming or outgoing calls are permitted based on phone number and location (see abstract; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112');

the read only memory (58) also for storing one or authorized geographic areas (e.g., home system or roaming), wherein each authorized geographic area comprises absolute or relative position (e.g., geographic area 74, 76, 78, 80) information (see col. 7, lines 46-59,27-40; Figs. 4 and 5 'ref. 84'), where the mobile station is able to determine the location and to check as to whether the station is roaming;

a user interface (e.g., call initiator 36) accepting an inputted phone number (e.g., phone number) having an area code (e.g., phone number) (see col. 5, lines 50-54,60-62; col. 6, lines 7-8; col. 7, lines 42-44; Figs. 2 and 5 'ref. 82'), where the user of the mobile station (28) dials the phone number of another communication device in which the phone number is a 10-digit number that has an area code;

determining a current location (e.g., geographic area 74, 76, 78, 80) of the wireless communication device (28) (see col. 7, lines 46-59,27-40; Figs. 4 and 5 'ref. 84'), where the mobile station is able to determine the location and to check as to whether the station is roaming;

a processor (54) which reads on the claimed "controller" connected to the read only memory (58), the user interface (36) (see col. 6, lines 4-16,27-28; Fig. 2), where the mobile station has a transceiver (30),

the controller (54) configured to (see col. 6, lines 15-16; Fig. 2)

determine whether the inputted phone number will incur a charge based on an evaluation of at least the area code (e.g., phone number) (see col. 6, lines 15-16,27-45; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2, 3, and 5 'ref. 82'), where the memory (58) stores phone numbers in a phone book, and where the user of the mobile station (28) is able to dial phone numbers to originate a call to another communication device in which the phone number is a 10-digit number that has an area code (see col. 5, lines 51-54,60-62; col. 6, lines 7-8; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2 & 5 'ref. 82'), and where the phone numbers and the associated information are considered acceptable and independent of location in which the will in a charge would be implicit to allow an incoming/outgoing call (see col. 7, lines 9-11; col. 1, lines 48-53) as evidenced by the fact that one of ordinary skill in the art would clearly recognize,

the current location (e.g., geographic area 74, 76, 78, 80) (see col. 7, lines 46-59,27-40; Figs. 4 and 5 'ref. 84'), where the mobile station has a memory (58) and is able to determine the location and to check as to whether the station is roaming and where the determinator (40) provides location information to the processor (54) (see col. 6, lines 15-16; col. 7, lines 46-59,27-40; Figs. 2, 4, and 5 'ref. 84'), and

the list comprising area codes (e.g., phone number - home system or prohibited) and the one or more authorized geographic areas stored in the read only memory (58) (see col. 6, lines 15-16; col. 7, lines 46-59,27-40; col. 1, lines 48-53; Figs. 2, 4, and 5 'ref. 84'), where the determinator (40) provides location information to the processor (54) and where incoming or outgoing calls are prohibited when roaming based on phone number and

location (see col. 8, lines 6-10; col. 9, lines 14-18,45-50; Figs. 5 'ref. 92' and 6a 'ref. 124 & 128') and where incoming or outgoing calls are permitted based on phone number and location (see abstract; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112'),

wherein the controller is further configured to permit placement of a phone call to the inputted phone number only if the area code is an authorized area code (e.g., phone number - home system or prohibited) and the current location (e.g., geographic area 74, 76, 78, 80) of the wireless device (28) is within an authorized geographic area (e.g., home system) (see abstract; col. 7, lines 46-59,27-40; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112'), where incoming or outgoing calls are permitted based on phone number and location and the memory stores phone numbers in a phone book, and where the user of the mobile station (28) is able to dial phone numbers to originate a call to another communication device in which the phone number is a 10-digit number that has an area code (see col. 6, lines 15-16,27-45; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2, 3, and 5 'ref. 82')as evidenced by the fact that one of ordinary skill in the art would clearly recognize.

As further support of Schmidt disclosing of the claim feature a list comprising area codes (e.g., phone number) (see col. 5, lines 50-54; col. 7, lines 9-11,42-44; Fig. 5 'ref. 82'), Rodriguez at the least explicitly discloses "*…the number entered is compared…the area code and the dialing prefix, i.e., the first 3 of 7 numbers...compared to a set of authorized pairs of area codes…*" (see Rodriguez - col. 8, lines 1 et seq.]). Schmidt does not specifically disclose having the feature(s) a global positioning system (GPS) device for

determining a current location of the wireless communication device; a controller connected to the GPS device, the controller configured to determine the current location. However, the examiner maintains that the feature(s) a global positioning system (GPS) device for determining a current location of the wireless communication device; a controller connected to the GPS device, the controller configured to determine the current location was well known in the art, as taught by Agness.

Agness further discloses the feature(s) a global positioning system (GPS) device (45) for determining a current location of the wireless communication device (13) (see col. 6, lines 21-25, 33-36; col. 8, lines 37-51; Fig. 2), where the cell phone (13) has a GPS circuit (45) for determining the position which is used to restrict calls that are directed to the cell phone (13);

a microprocessor (43) which reads on the claimed "controller" connected to the GPS device (45) (see col. 6, lines 21-25, 33-36; col. 8, lines 37-51; Fig. 2);

the controller (43) configured to determine the current location (see col. 6, lines 21-25, 33-36; col. 8, lines 37-51; Fig. 2), where the cell phone (13) has a GPS circuit (45) for determining the position which is used to restrict calls that are directed to the cell phone (13).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Schmidt (as supported by Rodriguez) and Agness to have the feature(s) a global positioning system (GPS) device for determining a current location of the wireless communication device; a controller connected to the GPS device, the controller configured to determine the current location, in order to provide a transmission inhibit for digital hand-held cell phones when at specified highway location and

specified other restricted locations or during specified restricted times Agness (see col. 2, lines 38-41).

Regarding **claim 63**, Schmidt discloses a method for restricting a requested communication on a wireless communication device, comprising:

storing in a read only memory (58) of the wireless communication device (28) one or more authorized geographic areas, wherein each authorized geographic area comprises absolute or relative position (e.g., geographic area 74, 76, 78, 80) information (see col. 7, lines 46-59,27-40; Figs. 4 and 5 'ref. 84'), where the mobile station is able to determine the location and to check as to whether the station is roaming;

storing a the read only memory (58) of the wireless communication device (28) one or more authorized telephone number area codes (e.g., phone number) (see col. 6, lines 27-34,46-63; col. 7, lines 46-54; Figs. 2-4), where the memory stores information for permitting or prohibiting an incoming and outgoing call based on the phone number and location and where the determinator (40) provides location information to the processor (54) (see col. 6, lines 15-16; col. 7, lines 46-59,27-40; col. 1, lines 48-53; Figs. 2, 4, and 5 'ref. 84') and where incoming or outgoing calls are prohibited when roaming based on phone number and location (see col. 8, lines 6-10; col. 9, lines 14-18,45-50; Figs. 5 'ref. 92' and 6a 'ref. 124 & 128') and where incoming or outgoing calls are permitted based on phone number and location (see abstract; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112');

receiving the requested communication, wherein the requested communication comprises a telephone number having an area code (e.g., home system) (see abstract; col. 7, lines 46-

59,27-40; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112'), where incoming or outgoing calls are permitted based on phone number and location and the memory stores phone numbers in a phone book, and where the user of the mobile station (28) is able to dial phone numbers to originate a call to another communication device in which the phone number is a 10-digit number that has an area code (see col. 6, lines 15-16,27-45; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2, 3, and 5 'ref. 82')as evidenced by the fact that one of ordinary skill in the art would clearly recognize;

determining whether the area code of the requested communication telephone number is an authorized telephone number area code (e.g., phone number) stored in the read only memory (58) of the wireless communication device (e.g., home system) (see abstract; col. 7, lines 46-59,27-40; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112'), where incoming or outgoing calls are permitted based on phone number and location and the memory stores phone numbers in a phone book, and where the user of the mobile station (28) is able to dial phone numbers to originate a call to another communication device in which the phone number is a 10-digit number that has an area code (see col. 6, lines 15-16,27-45; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2, 3, and 5 'ref. 82')as evidenced by the fact that one of ordinary skill in the art would clearly recognize;

identifying a current location (e.g., geographic area 74, 76, 78, 80) of the wireless communication device (28) (see col. 7, lines 46-59,27-40; Figs. 4 and 5 'ref. 84'), where the mobile station is able to determine the location and to check as to whether the station is roaming;

determining whether the current location (e.g., geographic area 74, 76, 78, 80) of the wireless communication device (28) is within an authorized geographic area (e.g., geographic area 74, 76, 78, 80) stored in the read only memory (58) of the wireless communication device (28) (see col. 7, lines 46-59,27-40; Figs. 4 and 5 'ref. 84'), where the mobile station has a memory (58) and is able to determine the location and to check as to whether the station is roaming and where the determinator (40) provides location information to the processor (54) (see col. 6, lines 15-16; col. 7, lines 46-59,27-40; Figs. 2, 4, and 5 'ref. 84');

initiating a call to the telephone number in the requested communication only if the area code (e.g., phone number) of the requested communication telephone number is an authorized telephone number area code and the current location of the wireless communication device (28) is within an authorized geographic area (e.g., home system) (see abstract; col. 7, lines 46-59,27-40; col. 7, line 58 - col. 8, line 10; col. 8, lines 44-59; Figs. 5 'ref. 86 and 90', 6a 'ref. 108 and 112'), where incoming or outgoing calls are permitted based on phone number and location and the memory stores phone numbers in a phone book, and where the user of the mobile station (28) is able to dial phone numbers to originate a call to another communication device in which the phone number is a 10-digit number that has an area code (see col. 6, lines 15-16,27-45; col. 7, lines 42-44; col. 5, lines 50-54; Figs. 2, 3, and 5 'ref. 82')as evidenced by the fact that one of ordinary skill in the art would clearly recognize.

As further support of Schmidt disclosing of the claim feature area codes (e.g., phone number) (see col. 5, lines 50-54; col. 7, lines 9-11,42-44; Fig. 5 'ref. 82'), Rodriguez at the least explicitly discloses "*…the number entered is compared…the area code and the dialing*

prefix, i.e., the first 3 of 7 numbers…compared to a set of authorized pairs of area codes…" (see Rodriguez - col. 8, lines 1 et seq.]). Schmidt inexplicitly discloses having the feature(s) identifying a current location of the wireless communication device; determining the current location of the wireless communication device. However, the examiner maintains that the feature(s) identifying a current location of the wireless communication device; determining the current location of the wireless communication device was well known in the art, as taught by Agness.

Agness further discloses the feature(s) identifying a current location of the wireless communication device (13) (see col. 6, lines 21-25, 33-36; col. 8, lines 37-51; Fig. 2), where the cell phone (13) has a GPS circuit (45) for determining the position which is used to restrict calls that are directed to the cell phone (13);

determining the current location of the wireless communication device (13) (see col. 6, lines 21-25, 33-36; col. 8, lines 37-51; Fig. 2), where the cell phone (13) has a GPS circuit (45) for determining the position which is used to restrict calls that are directed to the cell phone (13).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Schmidt (as supported by Rodriguez) and Agness to have the feature(s) identifying a current location of the wireless communication device; determining the current location of the wireless communication device, in order to provide a transmission inhibit for digital hand-held cell phones when at specified highway location and specified other restricted locations or during specified restricted times Agness (see col. 2, lines 38-41).

Response to Arguments

5. Applicant's arguments with respect to claims 46, 48, and 59-67 have been considered but are moot in view of the new ground(s) of rejection necessitated by the amended language and/or new limitations.

In response to applicant's arguments, the Examiner respectfully disagrees as the applied reference(s) provide more than adequate support and to further clarify (see the above claims for relevant citations).

6. The Examiner requests applicant to provide support (e.g., page(s), line(s), and drawing(s) as well as comments) for the amended claim language and any further amended claim language.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIE J. DANIEL JR whose telephone number is (571)272-7907. The examiner can normally be reached on 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Appiah can be reached on (571) 272-7904. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/WJD, Jr/

WJD,Jr
18 October 2009

/Charles N. Appiah/
Supervisory Patent Examiner, Art Unit 2617

APPENDIX

Related Proceedings

None